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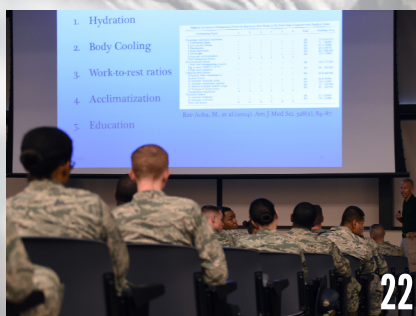
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PERTINACITY

The Stories of KSI

2015 Fall, volume 1, issue 2

KOREY STRINGER INSTITUTE



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UConn
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KOREY STRINGER INSTITUTE- Providing first-rate information, education,
research, assistance and advocacy to protect athletes, soldiers, and laborers.

KSI
Korey Stringer Institute
UNIVERSITY OF CONNECTICUT
Preventing sudden death in sport

THE BEST DAYS, THE BEST MOMENTS

**DOUGLAS J. CASA, PHD, ATC, FASCM, FNATA
CEO, KOREY STRINGER INSTITUTE**



Dr. Douglas Casa celebrated his 30th year survival party with his family, friends, and the athletic trainer who saved his life, Kent Scriber, ATC.

Imagine this scene: we were driving on a rugged dirt road in the outback of Lackland Air Force Base outside of San Antonio, Texas in late September. We kept driving, and driving, and driving. Eventually we made it to a remote training area where some of our most elite airmen train to protect our country. At that moment while standing in the middle of a Texas field, I felt the most extreme sense of honor and pride for my country. They are doing this for all of us, so we can have a safe country and the best opportunities. Later when I returned home, I tried explaining this feeling to my children; however, they cannot even begin to comprehend the magnitude of the commitment and sacrifice. Perhaps, they get it a little better than most kids, but I want them to feel what I felt when I was standing in the middle of the Texas field. My kids' maternal grandfather is a retired US colonel who served in four countries in South America; their uncle served two tours in Afghanistan, one in the demilitarized zone in South Korea, and another in Bosnia; and their own mother had 27 homes in her first 26 years of life as part of the process of being part of a military family.

The Air Force leadership had invited the Korey Stringer Institute (KSI) to consult with the members of the 559th Medical Group on their management of exertional heat stroke (EHS) cases in remote settings that are common in military training. Previously, KSI had the privilege to provide this consulting support for the US Army at Fort Benning, GA and at Fort Bragg, NC by interacting with an array of soldiers and special forces, including the Army Rangers. However, being in Lackland was different. This was not just an educational visit. They were seeking our expert opinions to revisit and update their policies that they implement at their training sites. Imagine a collapsed airman with EHS nine miles from a medical station, with limited supplies and the clock ticking – and KSI is making the recommendation of what the best course of action would be to assure the airman's survival. This is not something that makes us nervous; in fact, we cherish this opportunity, and it is a chance to share our expertise to help protect the men and women who help protect us. It was the most important professional moment of my life. As I stood in this remote setting with my two colleagues from KSI (Rebecca Stearns and Luke Belval), I realized that the

I began to realize that I am beginning to pay back the second chance I got at life when I survived my heat stroke 30 years ago.

tireless efforts since we created KSI are developing into an organization with great influence and opportunity.

Rewinding the time back to six weeks before the visit to Lackland, another one of the most amazing moments for KSI occurred when I was standing at the Falmouth Road Race medical tent in mid-August with a team of 35 people from KSI and 100 other volunteers who were working in the medical tent at the finish line. I know you are supposed to say that the day you get married or the birth of your first child should be the best day of your life, but for me it was this day. I am in charge of triage at the finish line medical tent and work under the direction of the two incredible medical directors (Dr.'s Robert Davis and John Jardine) and with the skilled direction of the medical coordinator (Chris Troyanos). Well, this was no average day at the office. We encountered 42 EHS (for real) and 55 heat exhaustion cases in the span of less than 2 hours. Utilizing assessments of rectal temperature and central nervous dysfunction, we triaged at a rate of one case per minute, and the team worked in an impressive manner to assure rapid cooling for all patients. As a result, we saved every single EHS patients that was admitted to the medical tent. After the last patient was treated, I was truly exhausted but had never felt more useful in my life. It was a few hours later when I went for a swim in the ocean with two of my kids (who had also assisted in the medical tent) that I felt a satisfaction that I could never recapture. I was truly thankful to have made a difference, to be able to save the lives of runners who could have otherwise been in critical condition after the race.

It was in these two momentous events, in addition to many smaller ones leading to this point, I began to realize that I am beginning to pay back the second chance I got at life when I survived my heat stroke 30 years ago. On August 8, 2015, I celebrated my 30th survival party at a beach in Montauk, NY, with my closest family and friends. The person who saved my life (Kent Scriber, ATC) was able to attend. As we stood on the beach talking that evening, I was smart enough to realize that the hand I had been dealt had been a royal straight flush (and playing poker is one of my favorite activities). From the amazing care for my EHS, loving parents, amazing colleagues at UCONN and KSI, and the family and friends that lift you toward a greater good, I am grateful for it all. I looked at my kids running on the beach and said, "Wow." I took a deep breath. Then I sat down, overwhelmed at what has transpired over the past 30 years.

Thanks to everyone who has been a part of this amazing journey with me. You may have smarter, harder working, nicer, more patient (and certainly better looking) friends, but you will never have a friend and colleague more thankful than I.

OUR MISSION AND ENDEAVOURS COULD NOT HAVE BEEN MADE POSSIBLE WITHOUT OUR CORPORATE PARTNERS. WE ARE GREATLY APPRECIATIVE OF YOUR CONTINUED SUPPORT.



National Football League: The National Football league is a founding partner of the Korey Stringer Institute. The NFL supports multiple player safety initiatives for athletes of all levels. For more information on the NFL's Health and Safety Initiatives, visit [NFL Evolution](#).

Gatorade: Gatorade is a founding partner of the Korey Stringer Institute. Gatorade and the **Gatorade Sport Science Institute** continue to search for and study new and innovative ways to help athletes improve performance by facilitating proper hydration and nutrition.

Camelbak: The mission of Camelbak is to continuously reinvent and forever change the way people hydrate and perform. Visit [Hydrated](#) for useful resources on hydration practice.

Kestrel Pocket Weather Meters by Nielsen-Kellerman: Nielsen-Kellerman is committed to ensuring that people know the weather and environmental conditions that impact their health, safety and bottom line. NK's Kestrel meters are rugged, accurate, fully calibrated, portable, affordable and easy to use. KSI uses these wet bulb globe temperature thermometers to determine environmental conditions during research studies both inside the heat chamber and in field studies. Visit [heatstress.com](#) for resources on physical activity in heat stress.

One Beat CPR & AED: One Beat CPR + AED is one of the largest distributors of defibrillators and accessories in the United States. One Beat CPR + AED offers an expansive line of AED products and accessories. One Beat CPR + AED also offers American Heart Association (AHA) and American Safety Health Institute (ASHI) authorized training certifications. Be prepared to save the life of a teammate, fan, friend, or loved one.

Mission Athletecare: Mission Athletecare has a dual mission. While delivering world-class innovations that meet the unique needs of an athletic lifestyle, Mission also makes an impact off the field of play through the **M Foundation**, which promotes the health and safety of youth athletes, and simultaneously recognizes and awards high school athletes that give back to their community. Mission is currently running the **Heat Safety Pledge** initiative to advocate for heat safety awareness.

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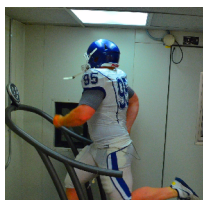


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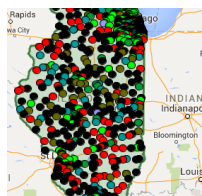
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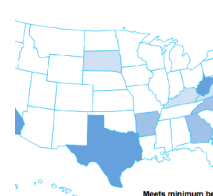
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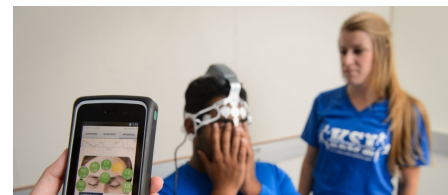
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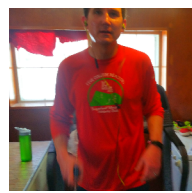
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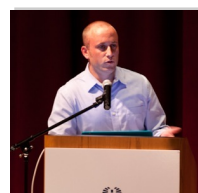
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Upcoming Events

CATCH-ON: PRIVATE SCHOOL

TABLE 1. ATHLETIC TRAINING (AT) SERVICES BY STATE

State	Response Rate (n)	Percent Schools with Full Time ATs	Percent Schools with Part Time ATs	State	Response Rate (n)	Percent Schools with Full Time ATs	Percent Schools with Part Time ATs
Alabama	32% [45]	13%	40%	Missouri	48% [59]	19%	19%
Alaska	50% [66]	0%	33%	Montana	25% [6]	0%	33%
Arizona	21% [12]	25%	17%	Nebraska	46% [17]	24%	59%
Arkansas	27% [13]	31%	8%	Nevada	25% [5]	40%	20%
California	29%	27%	24%	New Hampshire	35% [14]	64%	21%
Colorado	28% [17]	24%	29%	New Jersey	50% [80]	36%	10%
Connecticut	37% [28]	46%	29%	New York	30% [94]	22%	22%
Delaware	70% [19]	53%	32%	N. Carolina	23% [46]	17%	22%
D.C.	50% [9]	56%	44%	N. Dakota	40% [4]	25%	75%
Florida	26%	22%	28%	Oklahoma	49% [22]	18%	14%
Georgia	35% [61]	30%	26%	Oregon	34% [22]	9%	18%
Hawaii	40% [13]	39%	46%	Pennsylvania	40% [114]	44%	22%
Idaho	31% [5]	0%	0%	Rhode Island	39% [9]	44%	0%
Illinois	42% [68]	34%	25%	S. Carolina	21% [25]	36%	16%
Indiana	46% [51]	14%	24%	S. Dakota	46% [6]	17%	50%
Iowa	45% [19]	16%	42%	Tennessee	27% [36]	42%	39%
Kansas	49% [23]	13%	17%	Texas	45% [121]	22%	26%
Kentucky	37% [30]	13%	24%	Utah	21% [5]	40%	20%
Louisiana	76% [98]	19%	12%	Vermont	37% [11]	55%	0%
Maine	38% [18]	33%	44%	Virginia	51% [80]	32%	27%
Maryland	34% [56]	48%	21%	Washington	63% [47]	23%	17%
Massachusetts	49% [62]	48%	21%	West Virginia	32% [12]	0%	8%
Michigan	55% [81]	14%	22%	Wisconsin	35% [37]	19%	46%
Minnesota	45% [35]	11%	31%	Wyoming	33% [1]	0%	0%

**CATCH ON- COLLABORATION FOR ATHLETIC TRAINING COVERAGE AT HIGH SCHOOLS:
AN ONGOING NATIONAL SURVEY- PRIVATE SCHOOLS**

BY ALICIA PIKE, MS, ATC, ASSISTANT DIRECTOR OF YOUTH SPORT SAFETY

The Korey Stringer Institute conducted a follow-up to the [Benchmark Study on Athletic Training Coverage at Public High Schools](#), and assessed the level of medical coverage at the **private secondary school** setting across the United States. Through valiant efforts, the KSI staff **called all 5,414 private secondary schools** in order to gain insight on athletic training services provided to their student athletes. After many digits dialed and calls made, we were able to get a 38% response rate. The following tables depict extent of AT services overall in the private secondary school setting, by state, as well as by school size.

TABLE 1. ATHLETIC TRAINING (AT) SERVICES IN PRIVATE SECONDARY SCHOOLS

	AT Services in Private Secondary Schools
Full Time AT Services	28% (574/2,040)
AT Coverage Every Afternoon	40% (767/1,901)
Total AT Services	58% (1,176/2,044)
% Athletes with Access to AT Services	84% (281,285/336,165)

TABLE 3. ATHLETIC TRAINING (AT) SERVICES BY PRIVATE SCHOOL SIZE

Student Enrollment	Have AT Services	Do Not Have AT	Full Time AT Services
< 100 students	15%	85%	2%
≥ 100 students	72%	28%	41%
≥ 200 students	82%	18%	52%
≥ 300 students	87%	13%	61%
≥ 400 students	93%	7%	69%
≥ 500 students	94%	6%	72%

SPOTLIGHT

THE SPOTLIGHT SERIES WILL FEATURE THE PEOPLE OF THE KSI, AND THOSE WHO SHARE AND REPRESENT THE PASSION OF THE KSI.



MIKE CARROLL

MEDICAL & SCIENCE ADVISORY BOARD KOREY STRINGER INSTITUTE

Could you tell us about yourself?

I am the head athletic trainer and assistant athletic director at Stephenville HS in Stephenville, Texas. This is my 13th year here and my 26th year overall in the profession. I have always been very active in association activities. I have served on the board of directors for my local, state, and regional associations. I was the president of SWATA in 2009-2010. I think that being active in my professional organization is very important and if my time can help to improve the profession, then it was time well spent. I have been married to DeNae Carroll for 17 years. We have a son Nolan (15) and a daughter DeLaney (11). We also host foreign exchange students. Right now we have Belle from Adelaide, Australia.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute?

I knew of Doug Casa's work with heat illness research long before I met him. I had the opportunity to listen to Dr. Casa speak at a conference several years ago and I went up and introduced myself. We struck up a friendship based on our similar goals of helping organizations and state associations set better guidelines to help save the lives of their participants.

In what ways has KSI impacted you?

KSI has impacted me and my state by providing research based information to help the decision makers at the state level develop better policies. When that happened it has improved the health and safety for every single student athlete in the state of Texas.



JEFFREY PETAK

BOARD OF ADVISORS KOREY STRINGER INSTITUTE

Could you tell us about yourself?

My name is Jeffrey Ryan Petak. I was born in Joliet, Illinois in 1981. I moved to Plantation, Florida in 1991. I played baseball growing up at Plantation High School and at Lynn University. I earned my Bachelors Degree in Exercise Science and Health Promotion from Florida Atlantic University. After college, I coached baseball and golf, while teaching at Plantation High School. I did this for seven years. After deciding to make a career change, I started working with One Beat CPR + AED in August of 2012. My mission is to equip schools and youth sport organizations throughout the country with Philips Automated External Defibrillators (AED). I manage a team that works with many industries nationwide such as fitness centers, doctors offices, golf and country clubs, municipalities, police departments, places of worship, and more to ensure they are prepared in the event of a cardiac emergency. I enjoy golfing and working out. I believe that if we feel young and stay active, we will extend our healthy active years and our lifespan.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute?

From the first time I met with Dr. Casa and the KSI family, I understood immediately why KSI was having so much success and why so many companies and organizations wanted to work with this group of individuals. Dr. Casa invited us up to Storrs and instead of meeting at an office right away, he invited myself and a colleague, along with the owner of One Beat CPR + AED, to his home. He wanted us to meet his family and his team. We had a great meal, some laughs, and even played ping pong. I felt his family must practice quite often. They beat us. I stress the word family in this answer

because Dr. Casa creates an environment that I feel all are welcomed and we all feel that we are in this together. We all have the same goal, but we each have our own tasks and responsibilities in order to achieve this mission.

The following day we had a chance to visit the KSI headquarters and learn more about projects taking place and the impact KSI was having throughout the country. After a day of discussion and learning more about the direction KSI was going, we wanted to be part of this team and contribute in any way we could to this collective effort.

In what ways has KSI impacted you?

I have seen how the death of Korey Stringer has impacted thousands, if not millions, of lives. I have witnessed stories and testimonials about lives being saved due to the teamwork and hard work of countless individuals honoring Korey's memory. This tragic and preventable death has had an impact on all mankind around the world. So, how has this KSI impacted me? If I teach one more individual as a result of KSI introducing me to someone, if I place one more AED due to KSI recommending me, if I educate one person about cardiac arrest or heat illnesses due to my involvement with KSI, I have made the world a better place and done something that can save a life. I take great pride in what we do at One Beat CPR + AED and knowing we have partners that are as passionate as we are serves as encouragement each day to do our best.

SARAH ATTANASIO ASSISTANT DIRECTOR OF SPORT SAFETY POLICIES KOREY STRINGER INSTITUTE

Could you tell us about yourself?

I am currently a senior at the University of Connecticut, pursuing a bachelor's degree in Athletic Training from the department of Kinesiology. During my time in the program, I have assisted athletic trainers in a variety of settings including Bloomfield High School, Pomfret High School, Eastern Connecticut State University, UConn field hockey, and most recently with the football team at Trinity College. As the Assistant Director of Sport Safety Policies within the Korey Stringer Institute (KSI), I have worked on a number of research projects at the Korey Stringer Institute regarding heat illness, athletic trainer prevalence, and concussion related evaluations.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute?

I began working with KSI during my third semester at UConn. The first project I worked on involved calling every private and public high school in the country to inquire about whether or not they had an athletic trainer on staff. If so, I asked further questions to find out what kind of medical services they provided to their student athletes, and what sports they covered. Our current work on this project involves compiling the information and creating a 2D map of all schools in America and their athletic training services. Working on this project led me to find a true enjoyment in conducting and being apart of the latest research in sport and active individuals.

In what ways has KSI impacted you?

I have been fortunate to work as the Assistant Director of Sport Safety Policies within the Korey Stringer Institute. KSI has impacted my professional career and has led me to really enjoy research and exploring techniques to improve health care and efficiency within patients. I am currently involved in a project regarding objective brain function and the assessment of traumatic brain injuries. The project includes analyzing at the initial injury as well as rehabilitation and treatment optimization. We are working with both UConn and Eastern Connecticut State University athletes to find out if there is a way to diagnose a concussion objectively. Some of my favorite experiences with KSI have been working within the medical tent at the yearly Falmouth Road Race, in Falmouth, Massachusetts. Over twenty-five of the KSI members, including myself, assist in the medical tent initiating proper procedures regarding numerous heat strokes and other emergency situations. I have been fortunate to have the opportunity to collaborate with and learn from many knowledgeable athletic trainers in the organization, thus helping me to develop my own confidence in the practice. I have a deeper understanding of the risks and dangers athletes face within heat exposures and the steps to take after it has been identified. I am able to extend my learning from KSI and apply it directly to other experiences in the field of athletic training and medical care. I consider it imperative work and my responsibility to continuously advocate for ways to make sports safer for athletes both now and in the future.



KSI has impacted my professional career and has led me to really enjoy research and exploring techniques to improve health care.

Vermont City Marathon



BY ANDREA FORTUNATI, BS, ATC

ASSISTANT DIRECTOR OF
ELITE ATHLETE HEALTH AND PERFORMANCE

KSI was represented for the first time at the 27th annual People's United Bank Vermont City Marathon & Relay that was held on May 24th, 2015 in Burlington, VT. The race included 8,000 participants and began promptly at 8:00am with the wheelchair participants, followed by the runners at 8:03am.

Members of the Korey Stringer Institute, William Adams, Yuri Hosokawa, Luke Belval, and Andrea Fortunati worked in the main medical tent located at the finish line as well as at medical tents located at the midpoint of the race. This year, there were approximately 150 medical visits seen throughout the day with a total of six athletes transported to the University of Vermont Medical Center.

Four cases of exertional heat stroke were confirmed via rectal temperature and treated at the marathon. During all of these cases at least one member of KSI was present and aided in the treatment process. One case was treated at the medical tent located at mile 13 while the

other three cases were treated in the main medical tent at the finish line. In the critical care tent there were two cold-water immersion tubs and members of KSI ready to implement proper protocols and procedures that have been profoundly researched to treat EHS. Treatment for the cases in the critical care tent was conducted utilizing cold water immersion, which has been found to be the quickest and most effective way to cool the body, and rectal thermometry was used for body temperature assessment. As you may know, rectal thermometry is critical for the assessment of the internal body temperature, especially in those who are exercising in the heat. All EHS cases were transported to the UVMCMC upon the medical organizer's protocol for a follow-up examination. This is the second of several marathons KSI will be involved with this year, the first being at the Boston Marathon.

IRONMAN

Lake Placid

BY WILLIAM ADAMS, MS, ATC

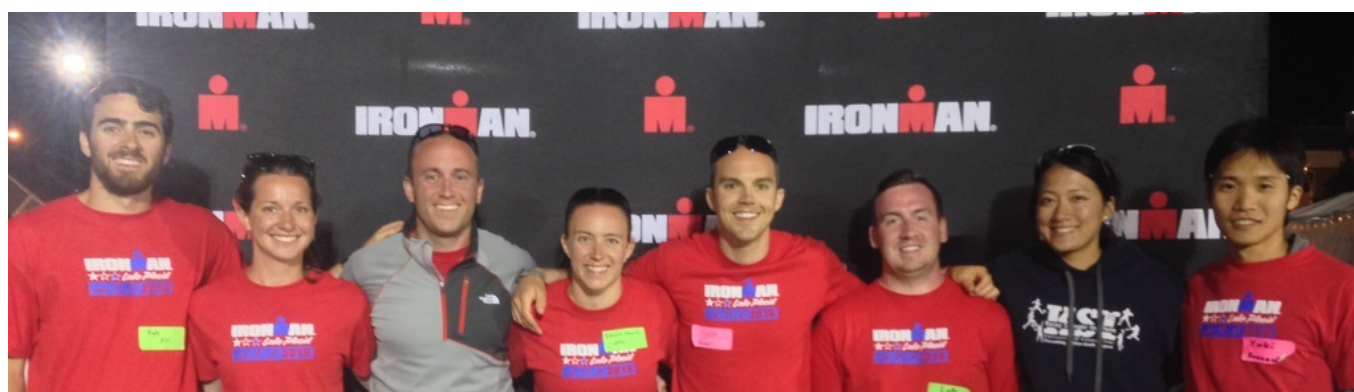
DIRECTOR OF SPORT SAFETY POLICIES

A few representatives from KSI traveled to Lake Placid, NY for the annual **Ironman Lake Placid** race on July 26th. For those that are unfamiliar with an Ironman race, it involves a 2.4-mile swim, 112-mile bike ride, and a 26.2-mile run. Competitors have 17 hours to complete the race and if successful can be proud to call themselves an Ironman.

This year's race was **unique** in a number of ways; 1) there were no professional triathletes that raced, allowing the overall male and female finisher to be an amateur athlete, 2) the environmental conditions became very hot (above normal for Lake Placid) halfway through the bike portion of the race, making the race much more stressful than anticipated, and 3) this year's race saw an athlete suffer from exertional heat stroke which is normally an uncommon

sight at a race of this length and duration.

KSI's purpose at Lake Placid was to **volunteer to assist in the medical tent at the finish line** to treat the athletes that became injured during the race. This year's race saw a variety of injuries that came to the medical tent throughout the day. Injuries that were treated inside the medical tent included dehydration, hyponatremia, musculoskeletal injuries, and many others. The most fortunate part of this experience was being able to see medical providers from various fields of expertise, from various geographical locations and settings come together to provide top-notch medical care for the 2,600 athletes participating in this year's race. Without these volunteers, the race would not have been a success.



Heat Tolerance Testing

BY REBECCA STEARNS, PHD, ATC
COO, KOREY STRINGER INSTITUTE
ROBERT HUGGINS, PHD, ATC

VP OF RESEARCH AND ELITE ATHLETE HEALTH AND PERFORMANCE

The Human Performance Lab has been very busy with heat tolerance testing sessions. These tests are part of the continuing care for exertional heat stroke patients who might be struggling to return to activity or would like more information regarding their body's readiness to return to physical activity following an episode of exertional heat stroke. In general, the test takes two hours and is conducted in a 104°F room with 40% humidity. The individual walks for the duration of the test and is monitored to determine if they meet a set of passing requirements (including body temperature and heart rate responses). "From these tests we are able to help provide a snapshot of an athlete's ability to tolerate environmental temperatures," said Rebecca Stearns, PhD, ATC, COO of the Korey Stringer Institute, "and from there, we can determine a path forward for the athlete in conjunction with their sports medicine staff or the healthcare provider." A great example of the positive things that can come from the heat tolerance testing that KSI provides

aired on ESPN's College GameDay on October 24th. The show highlighted the [story of Hunter Knighton](#) who suffered an exertional heatstroke and successfully returned to play. "What KSI was able to do was give Hunter and his family some guidance and hope that with proper exercise progression, gradual acclimatization to exercise in the heat, and proper monitoring throughout his return that he could return to the game of football" said Robert Huggins, PhD, ATC, VP of Research and Elite Athlete Health and Performance for KSI.

We have continued to receive an increasing number of inquiries from athletes seeking to understand their recovery from exertional heat stroke. Additionally, we have initiated a research study in collaboration with the Falmouth Road Race, to investigate the recovery of heat stroke victims at this race. We have already completed testing with many athletes and continue to recruit to further expand this dataset, with the ultimate hope that this information can help to further define the recovery process and protocols for heat stroke victims.

Body Cooling and Sport Performance

BY WILLIAM ADAMS, MS, ATC, DIRECTOR OF SPORT SAFETY POLICIES

Recently, KSI staff members William Adams, Yuri Hosokawa, and Douglas Casa had a paper published in the Journal of Sport Rehabilitation titled: *Body Cooling Paradigm in Sport: Maximizing Safety and Performance During Competition*. This paper provides a comprehensive review surrounding the use of cooling modalities to enhance safety and performance during sport competition. The proposed theories behind using cooling modalities before competition, during competition, and after competition, are aimed at lowering or mitigating the rise in body temperature during competition to improve performance and reduce the risk of exertional heat illness as well as enhancing recovery after competition. Some unique aspects to this paper include an overview of commonly used cooling modalities that one would often find at sporting events (cooling fans, cold tubs, ice towels, etc.) as well as the application of these modalities during competition in various sports. The hope

of this paper is to provide knowledge to coaches, athletes, strength and conditioning coaches, and medical staff in developing body cooling strategies to provide a competitive edge over their opponents on the playing field.



NEACSM

BY LESLEY VANDERMARK, MS, ATC
DIRECTOR OF RESEARCH

The New England Chapter of the American College of Sports Medicine (NEACSM) held their annual fall meeting on October 15th and 16th in Providence, Rhode Island. The theme of this year's meeting was "Fueling Curiosity: Seeking Knowledge to Advance Health," which had a very strong focus on looking at the research to make good clinical decisions. Three members of the KSI team presented in a symposium with Dr. Patricia Deuster, Director of the Consortium for Health and Military Performance (CHAMP) at the Uniformed Services University of the Health Sciences (USUHS), on current research and updated best practices for heat tolerance testing following exertional heat stroke. Audience was a mix of

athletic trainers, physical therapists, exercise scientists, and physiologists, many of whom can use the information from the session to set their policies and standards of practice for returning to activity following exertional heat stroke. Dr. Douglas Casa started off the presentation by introducing the concept of exertional heat stroke, utility of appropriate treatment, and the consequences of inappropriate treatment. Further, the model of returning to exercise or labor following exertional heat stroke was introduced with the story of Gavin Class, a collegiate football player in the middle of a hard fought battle to return to collegiate athletics. *(continue to next page)*



Current research and best practices for heat tolerance testing following exertional heat stroke

Dr. Deuster discussed the military approach to returning a warrior athlete to duty. Determining when a warrior athlete is ready (safe) to return to duty is complicated and is underlined by the notion that a premature return puts the athlete, the mission, and their fellow soldiers at risk. The military uses the heat tolerance test protocol developed by the Israeli Defense Force (IDF), however, the results of this test are not always cut and dry, and ultimately a combination of factors in the patients history, test results, and work duties should be used together to determine readiness to return. Finally, Dr. Rebecca Stearns and Luke Belval presented some lessons learned from our experiences testing former exertional heat stroke patients, both laborer and athletes. At KSI, we've had the opportunity to test these patients multiple times, and not only the IDF heat tolerance test protocol which is primarily walking, but then adapt that protocol for better application to the stresses the patient would experience during their labor or sport. This type of model, with multiple testing time points and increased heat stress, can provide the clinicians with context for the athletes and provide more evidence to support return to play decisions.

KSI provides the following testing options that will assist athletes to optimize their performance and be safe.

- Heat tolerance test
- VO2max test
- Lactate threshold test
- Substrate utilization test
- Sweat rate and sweat electrolyte test
- Heat acclimatization
- Body composition DEXA scan

For more information, visit our website at:
<http://ksi.uconn.edu/services/athlete-testing/>

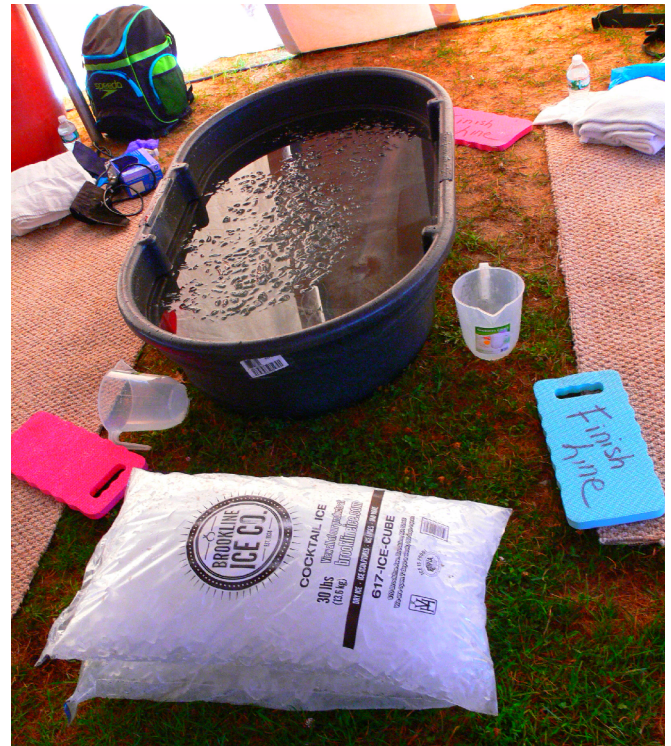
Research Corner

EFFECTIVENESS OF COLD WATER IMMERSION IN THE TREATMENT OF EXERTIONAL HEAT STROKE AT THE FALMOUTH ROAD RACE.

DEMARTINI , CASA, STEARNS, BELVAL, CRAGO, DAVIS, AND JARDINE.
MED SCI SPORTS EXERC. 2015;47(2):240-245.

A research study performed on “Effectiveness of Cold Water Immersion in the Treatment of Exertional Heat Stroke at the Falmouth Road Race” provides information on how one race in particular has been 100% successful in treating Exertional Heat Stroke (EHS) cases over the past 18 years of medical tent reporting data. The Falmouth Road Race is a 7 mile race that occurs in Falmouth, Massachusetts annually on the second Sunday in August. Proper cooling techniques of EHS used in the medical tent located at the finish line of the race involve cold water immersion (CWI). EHS cases have increased over the years, which is why proper cooling techniques need to be incorporated during all athletic events where an athlete is prone to getting a heat illness.

The methods of this study obtained data for 18 years from the finish line medical tent: 1984, 1989, 1992-1994, 1996-1998, 2001, and 2003-2011. If an exertional heat illness was suspected, the following information was obtained upon initial evaluation in the medical tent: rectal temperature (Tr), heart rate, and blood pressure. The patient was diagnosed with EHS diagnosed when $Tr > 40^{\circ}\text{C}$ (104°F) with central nervous dysfunction .



Key points:

- CWI provided a 100% survival rate of EHS over an 18 year period at the Falmouth Road Race
- CWI is the superior cooling method for EHS

Treatment of EHS in the medical tent at the Falmouth Road Race:

- Patients with EHS were immersed in 100-gallon tubs filled with water and ice (CWI)
- Monitor Tr, HR, BP every 2 minutes, continuously watching Tr
- Add ice to maintain 10°C water temperature in immersion tub
- Remove patient from CWI once Tr <38.8°C

Results from this research study:

- 274 EHS were presented in this 18 yr longitudinal study
- Average initial Tr = 41.44°C ± 0.63°C
- No significant differences of cooling rates among males and females
- No significant differences of cooling rates between age groups as classified between: 11-20, 21-30, 31-40, 41-50, 51-60, and 61-70 years old
- Average cooling rate 0.22°C·min⁻¹ ± 0.11°C·min⁻¹
- Falmouth Road Race encounters an average of 15.3 ± 13.0 EHS cases annually

ENVIRONMENTAL CONDITIONS AND THE OCCURRENCE OF EXERTIONAL HEAT ILLNESSES AND EXERTIONAL HEAT STROKE AT THE FALMOUTH ROAD RACE

BY RACHEL KATCH, BS, ATC
ASSISTANT DIRECTOR OF RESEARCH

DEMARTINI, CASA, BELVAL, CRAGO, DAVIS, JARDINE, AND STEARNS.
J ATHL TRAIN. 2014;49(4):478-485.

This research article titled, “**Environmental Conditions and the Occurrence of Exertional Heat Illnesses and Exertional Heat Stroke at the Falmouth Road Race**,” summarizes the occurrence and relationship of exertional heat illness (EHI) and environmental conditions at the Falmouth Road Race, in Falmouth, MA. As studied previously, the Twin Cities Marathon annually has 1-2 cases of exertional heat stroke (EHS) per 10,000 entrants, in contrast to the relatively high overall incidence of

EHS during the Falmouth Road Race (1–2 EHS cases per 1000 entrants), accounting for 40% of the total patients seen in the medical tent. This 10-fold increase in the incidence of EHS indicates factors other than performance and heat dissipation are increasing the likelihood of acquiring EHS during competitive running. To study this phenomenon, 18 years of medical records and environmental conditions (i.e., ambient temperature, relative humidity, and heat index) were documented alongside the incidence of EHI, specifically EHS.

Key points:

- The Falmouth Road Race provides a unique setting for the recognition and treatment of exertional heat stroke: the incidence rate during this race is 10 times that of other races.
- Environmental measures of ambient temperature and heat index contribute to a significant relationship between environmental stress and the occurrence of exertional heat stroke.
- Results showed a clear relationship between the incidence of EHI and EHS and the amount of environmental stress present, especially as measured by ambient temperature and heat index.
- Extreme environmental temperatures present when the race is ran and the short duration of the race promote higher intensities by runners, leading to a substantial number of EHS cases.



NATIONAL ATHLETIC TRAINERS' ASSOCIATION
POSITION STATEMENT: EXERTIONAL HEAT ILLNESS

CASA ET AL. J ATHL TRAIN. 2015;50(9):986-1000.

BY RACHEL VANSCHOY, BS, ATC
ASSISTANT DIRECTOR OF SPORT SAFETY POLICIES

The National Athletic Trainers' Association (NATA) released an updated **position statement on exertional heat illnesses (EHI)** in September of 2015. It is necessary for certified athletic trainers and medical personnel to understand the prevention, recognition, treatment, and return-to-activity of EHI. Exertional heat stroke (EHS) is the most severe and potentially life threatening exertional heat illness that includes two main diagnostic criteria; (1) central nervous system dysfunction accompanied by (2) a high body temperature greater than 40.5°C (105°F).

A few ways to prevent EHI are through heat acclimatization over a 10-14 day period, identifying athletes at risk, education of parents, coaches, and athletes, and having appropriate medical care available. The recommendations include the development of an emergency action plan (EAP) and to

rehearse EAPs annually with all relevant personnel to mitigate the risk of fatality from EHS. The best practice for acquiring body temperature is through obtaining a rectal temperature; all other measurements (i.e., tympanic, oral, axillary, aural canal) will inaccurately assess the body temperature, which can lead to misdiagnosis, improper treatment, and long lasting sequela or death.

The appropriate and necessary treatment for EHS is cold water immersion in order to rapidly cool the body temperature below 102.5°F (38.9°C) within 30 minutes of collapse. The key is to cool first, transport second. By following the current recommendations, medical personnel can reduce the occurrence of EHI, improve their ability to recognize and differentiate between the various classifications of EHI, and to enhance and encourage appropriate and timely treatment.

NOAA Heat Workshop



Yuri Hosokawa, MAT, ATC, Director of Communication and Education, presented at the opening plenary of the **"Workshop on the Development of Climate Information Systems for Heat Health Early Warning"** on July 29th. The meeting was hosted by the National Ocean and Atmosphere Administration (NOAA) in Chicago, IL. Climatologists, environmental health researchers, and public health officials from across the world were gathered at the meeting to discuss ways in which various entities could collaborate to enhance the climate information system to predict, recognize, and prevent heat related illnesses in the public. Public health and climatology has traditionally focused their efforts on vulnerable populations (e.g., elderly, children, and urban poor) to investigate elevated risk of heat related fatalities and emergency room visits during heat waves. However, not enough collaboration currently exists between climatologists and exercise scientists to quantify the risk of heat related illness in physically active populations such as athletes, laborers, and soldiers. Although the physically active population is more

BY YURI HOSOKAWA, MAT, ATC,
DIRECTOR OF COMMUNICATION AND EDUCATION

likely to be fit, these individuals who are otherwise healthy, are at risk of developing exertional heat illness when their activity load is not sufficiently managed to allow for a proper work to rest ratios. At the meeting, Hosokawa presented the basic concepts of thermal physiology and ways climate data can impact these at risk populations. By creating geographical region and task specific heat guidelines that account for an individual's fitness level, climatologists and exercise scientists can work together to reduce risk of heat illness.

As a follow up to this workshop, Hosokawa will be presenting at the American Meteorological Society's 96th Annual Meeting in New Orleans, LA, on January 12, 2015. Her presentation is on the prevalence of heat related fatalities, occurring during physical activity, with a specific focus on climatological data on the day of the collapse.

USA Football



BY LUKE BELVAL, BS, ATC,

DIRECTOR OF MILITARY AND OCCUPATIONAL SAFETY

USA Football, as an Educational Partner, is a key point of outreach for KSI with regards to youth sports in America. The hallmark of USA Football, the Heads Up Football Program, has been working closely with KSI over the past several years to incorporate heat and hydration issues into its curriculum. Additionally, Dr. Douglas Casa serves on the Medical Advisory Committee.

USA Football, as the sports governing body for youth football in America, has paid close attention to the increasing concern over safety in football. To this end, they reached out to experts in several fields to establish best practices to keep athletes safe. With content ranging from proper tackling technique to heat acclimatization, the training program seeks to empower youth football organizations through the use of player safety coaches. In a situation without an athletic trainer, having a coach who players can specifically go to with health concerns hopefully empowers more players to come forward and more coaches to identify potentially dangerous conditions.

Specific to KSI, the heat and hydration materials not only address the situation where an athlete might be having a heat illness, but also what coaches can do to

prevent these situations. By stressing heat acclimatization, hydration, and modifying activity based on environmental conditions, coaches are given easily translatable steps to lower the risk for an illness that is considered inherently linked with football.

Of particular note is a recent study conducted through the Datalys Center for Sport Injury Research and Prevention.[\(Kerr et al., 2015\)](#) The investigators in this study, which included KSI's Medical and Science Advisory Board Member, Dr. Susan Yeargin, evaluated injury rates in youth football programs that utilized the Heads Up Football program and contrasted the rates with those programs that did not use the program. For both practices and games the overall injury rate was significantly lower for programs that used Heads Up Football along with Pee Wee Football restrictions.

The efforts of KSI alongside USA Football strive to make meaningful changes to youth sports which allow safe participation at all levels. KSI is currently working to apply some of the successes that USA football has found with its policies to other youth sports governing bodies across the country in a variety of sports.

Lackland Air Force Base Visit

BY LUKE BELVAL, BS, ATC,

DIRECTOR OF MILITARY AND OCCUPATIONAL SAFETY

September 28th-30th, Dr. Douglas Casa, Dr. Rebecca Stearns, and Luke Belval visited the Joint Base San Antonio (JBSA)-Lackland to assist the 559th Medical Wing of the Air Force with the implementation of new heat illness policies designed to protect trainees and airmen performing activities at the base. JBSA-Lackland is the Air Force's training hub, with over 55,000 trainees/students per year. The trip included multiple briefings for medics, physicians, and training instructors concerning the recognition, prevention, and treatment of exertional heat illnesses.

The two-day visit was a follow-up to a previous visit Dr. Casa conducted as part of a working group in December of 2014. This previous working group, including Dr. Francis O'Connor from the Uniformed Services University for Health Sciences and a KSI Medical and Science Advisory Board member, left recommendations to reduce the likelihood of deaths in the trainee population from a variety of



U.S. Air Force photo, Staff Sgt. Jason Huddlest

Taking the lessons KSI has learned in athletic situations and applying them to the military...

conditions. Having taken those recommendations to heart, Capt. (Dr.) Nathaniel Nye from the 559th Medical Group and Chief of the Sports Medicine Clinic at JBSA-Lackland began to develop heat stroke care policies. Working in concert with KSI, Dr. Nye refined these policies over the past year to the point where his wing's leadership recognized the scope and importance of the effort they were undertaking. This led to critical revisions of Air Force-wide policies and protocols, which now implement evidence-based practice.

At this point Dr. Nye reached out to KSI to travel to JBSA and help train their leaders, drill instructors, and medical staff on the proper care of heat stroke. Over the course of 4 briefings, Dr. Casa presented the leading evidence based medicine on heat stroke to both their medical and non-medical staff. Dealing with everything from basic training to special operations units, JBSA's staff presented a variety of situations that were unique considerations, when it comes to the care of a heat illness.

In addition, the group from KSI visited 5 of the cooling stations Capt. Nye implemented as part of the policy. At each of these sites, KSI was able to work directly with the medics responsible for the care of trainees and airmen, demonstrating methods for treating patients and the nuances of heat stroke care. Medics and training staff were also able to demonstrate their abilities to give KSI a full picture of the capabilities and areas needing improvement at JBSA-Lackland. KSI finished the trip with a presentation to the base's leadership, providing recommendations on how to optimize their care and handle the logistics unique to their base. KSI's efforts with JBSA-Lackland and Capt. Nye highlight the wide sweeping reach of KSI. Taking the lessons KSI has learned in largely athletic situations and applying them to the military, is a way that KSI continues to expand and support the mission of maximizing safety and performance in the physically active.

Lessons learned: Jackson Preparatory School

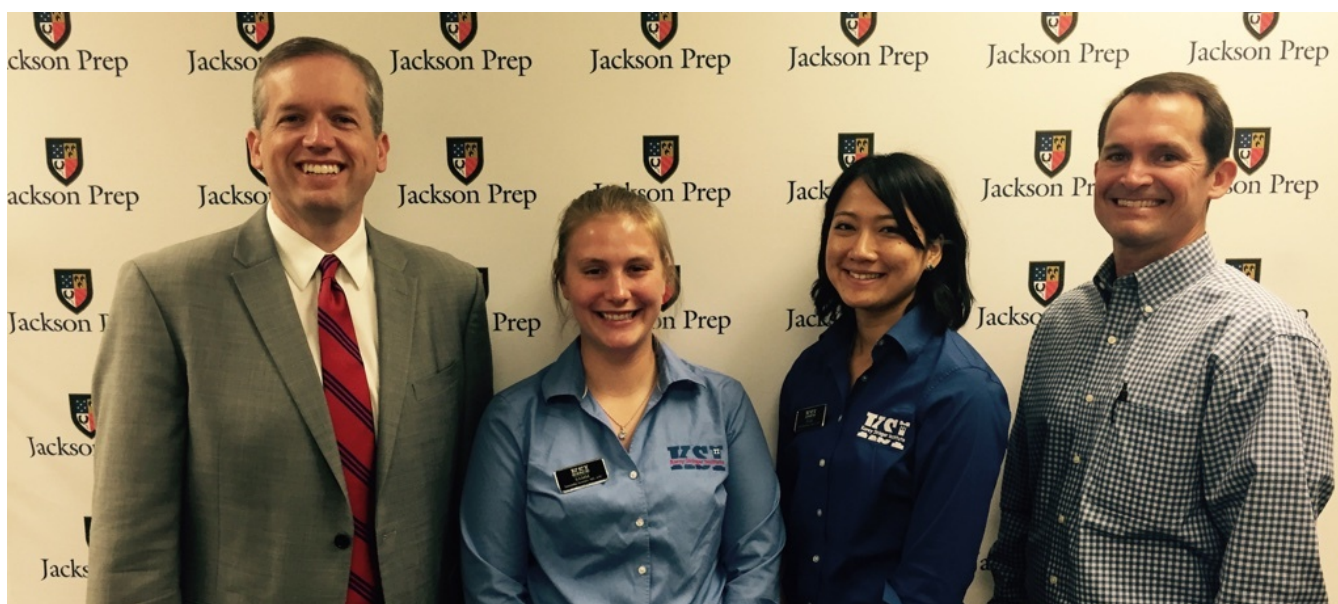
BY SAMANTHA SCARNEO, MS, ATC,
DIRECTOR OF YOUTH SPORT SAFETY

In May 2015, Director of Communications and Education, Yuri Hosokawa and the Director of Youth Sport Safety, Samantha Scarneo, attended Jackson Preparatory School (Jackson Prep) in Jackson, Mississippi. Tragically, in the fall of 2014, the school suffered a loss of one of their football athletes to exertional hyponatremia. Exertional hyponatremia occurs when the athlete is overhydrated or has a large electrolyte loss, causing an imbalance of sodium levels in the blood, which ultimately leads to brain swelling, if untreated. From this unfortunate event, the school was determined to never incur another tragedy like this again. Athletic Director, Will Crosby, and Head of School, Dr. Jason Walton, reached out to the Korey Stringer Institute to help make Jackson Prep one of the safest places to participate in athletics in Mississippi.

We were greeted with open arms upon arrival to their campus. We were able to meet a majority of their coaches, strength

and conditioning staff, and others who have daily interactions with athletes. The primary purpose for our visit and consultation with the school was to evaluate their campus facilities for AED placement, create emergency action plans (EAPs), and to educate their staff on EAPs and preventing sudden death in sport. At the end of our visit, we were able to provide our suggestions on best placement of additional AEDs. The school was also able to work with OneBeat CPR + AED to get eight additional AEDs for their campus, fields, and buildings. Furthermore, we were able to create new EAP for athletics, which includes information necessary to take a step-by-step process in what to do in the event of an emergency.

Following our May visit, Jackson Prep made several changes to improve the sports medicine and sport safety within their school. The biggest change by far was their hiring of a full time athletic trainer, Ricky Clark, ATC. Their newest



in addition to the Jackson Prep athletics department has responsibilities with all athletics and will provide both on field and athletic training room coverage. In addition to this, they have developed venue specific EAPs and educated all coaches and other key personnel on these plans. In addition to our on site visit, we were able to provide an in-service visit via Skype on preventing sudden death in sports. The presentation covered the top 10 causes of sudden death in sports (e.g., exertional heat stroke, exertional hyponatremia, sudden cardiac arrest) with tips for coaches in preventing, recognizing, and managing those situations, even when their athletic trainer may not be on site.

Every single one of their staff members was passionate to learn and discuss ideas and suggestions we provided. It was enlightening to see the overall intrigue and dedication these individuals had to improving safety for all of their student athletes. Everyday we strive to assist others with their goals of preventing

sudden death in sports, and it was certainly very rewarding to be able to assist Jackson Prep evolve into one of the model cases in youth sport safety. We are very fortunate to have had this opportunity to work with people who genuinely care for the safety of their student athletes.

-In what ways KSI has impacted you to improve the student athlete's safety at Jackson Prep?

Jackson Prep is grateful for the partnership we have with KSI and the impact the good people there have made on our school. It was obvious from the very start of our work together that Dr. Casa and his team sincerely care about not only helping prevent sudden death in sport, but also the individual student athletes their work affects. Because of our working relationship with KSI, Jackson Prep is a safer campus, a better school, and a more connected community.

*-Will Crosby
Athletic Director
Jackson Preparatory School*

The A.T.L.A.S. Project Update

ATHLETIC TRAINING LOCATIONS AND SERVICES PROJECT

BY ROBERT HUGGINS, PHD, ATC, VP OF RESEARCH AND ELITE ATHLETE HEALTH AND PERFORMANCE

Since the launch of the ATLAS project at the NATA symposium in St. Louis this year, the KSI team has been extremely busy working alongside the NATA Secondary Schools Committee (SSC) to map all of the athletic training services provided at the secondary school level across the nation! What we did was take all of the data from the Benchmark Study, which was funded by the NATA, and mapped every school based on their zip code using an online program called Zeemaps by Zee Source. Currently, KSI is working with secondary school committee chair Larry Cooper to distribute the ATLAS survey to 7 states (Alaska, Arkansas, New Hampshire, Louisiana, Oregon, Tennessee, Vermont). An email is being distributed by the SSC Chair to each state's athletic training association president who then is responsible for distributing the link of their state's map ([Louisiana example](#)) as well as the [ATLAS survey](#) to their secondary school members.

"Since this summer, we have had upwards of 10 undergraduate students, 2 graduate students, and Dr. Huggins working on organizing and merging the Benchmark Study data with the ATLAS survey data and right now we have it to a point where we can weekly update each state's map as the surveys come in" stated Sarah Attanasio, Assistant Director of Sports Safety Policies. With all of that manpower, KSI thinks that they are ready to handle the rest of the states and they hope that KSI will have over 5,000 responses by the end of the school year.

The mapping of each state in concert with the survey data is what KSI hopes will become something truly amazing. "Not only will this serve as a valuable resource to each state's athletic training association, this data can be used to assist with legislative efforts and hiring of athletic trainers, and based on some of the questions we ask in the survey, we can tell whether or not Athletic Trainers

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Preventing sudden death in sport

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NATA
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ATLAS

1. Check the national map
<https://www.zeemaps.com/map?group=1044231>

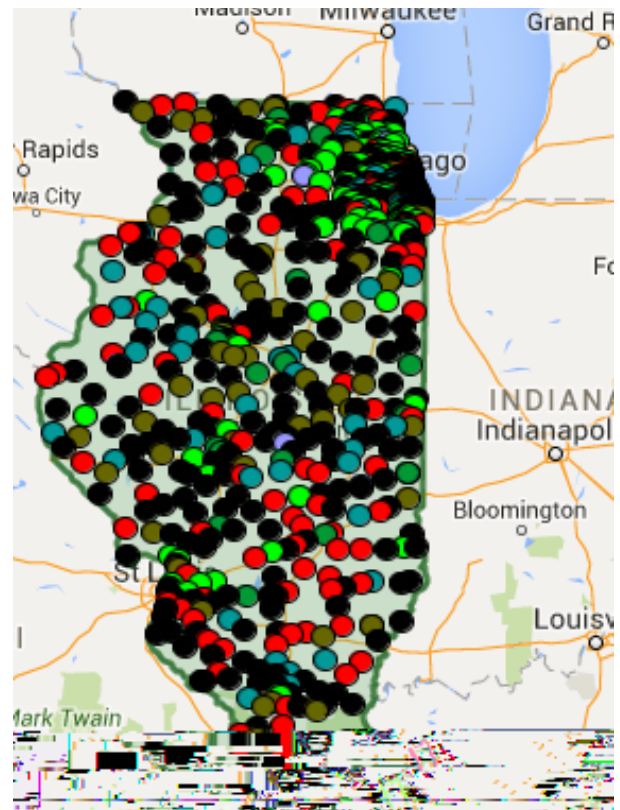
2. Answer the survey to add your secondary school's information to the map
https://uconn.col.qualtrics.com/jfe/form/SV_enPMxrKzlqIYRnL

are practicing emergency action plans, if they have their standing orders signed by a physician, and even improve communication following a concussion between two high schools athletic trainers that may not know each other" said Samm Scarneo, Director of Youth Sport Safety.

The information that the NATA SSC and KSI plan to obtain from this project is constantly evolving, and is something that KSI hopes will become "real time". We hope that Athletic Trainers in each state will be able to readily access ATLAS and use it to communicate, legislate for more full time positions. It is also our aim to utilize the national statistics data in research to figure out what factors result in an athletic trainer being hired full time in one district over another district; whether it is based on socioeconomic, geographic, or even population density.

Within the coming months, KSI plans to continue to distribute the survey with the help of the NATA SSC and each state's high school committee chairs, but they are also looking to start distributing via

e-blasts and the NATA website as well. Recently, NATA District 1 Director Tim Westin visited the KSI office and said "this project has huge potential and is something that is game-changing." He went on to say that that he would urge the members of District 1 as well as the other District Directors to complete the survey and help in any way he could.



Use of Emergency Action Plans in the Secondary Schools

BY WILLIAM ADAMS, MS, ATC, DIRECTOR OF SPORT SAFETY POLICIES

Table 1. Evidence-Based Recommendations for the Implementation of an appropriate and effective EAP to manage emergency situations in sport and physical activity.

	EMERGENCY ACTION PLAN POLICIES
1	Every school or organization that sponsors athletics should develop an EAP for managing serious and/or potentially life-threatening injuries
2	The EAP should be developed and coordinated with local EMS, school public safety officials, on site medical personnel or school medical staff, and school administrators
3	Every school should have a written EAP document distributed to all staff members
4	The EAP should be specific to each venue and include maps and/or specific directions to that venue
5	On-site emergency equipment that may be needed in an emergency situation should be listed
6	The EAP should identify personnel and their responsibilities to carry out the plan of action with a designated chain of command
7	Appropriate contact information for EMS
8	Facility address, location, contact information etc. should be identified in the EAP
9	Plan should specify documentation actions that need to be taken post emergency
10	EAP should be reviewed and rehearsed annually by all parties involved
11	Healthcare professionals who will provide medical coverage during games, practices, or other events should be included

An effective EAP should meet all evidence based-best practice recommendations (Table 1) and include each of the following components:

- **Emergency Personnel** – Describe the emergency team involved when the EAP is activated and the roles of each person.
- **Emergency Communication** – What communication devices are available, where, what number to call in an emergency, specific information and directions to the venue to provide to EMS response team.
- **Emergency Equipment** – Location of equipment should be quickly accessible and clearly listed. Equipment needs to be maintained on a regular basis.
- **Emergency Medical Transportation** – Describe options and estimated response times for emergency transportation.
- **Venue Directions with a Map** – Provide instructions for easy access to venue; directions should be specific to the location.
- **Roles of First Responders** – Establish scene safety and immediate care of the athlete.
- **Emergency Action Plan for Non-Medical Emergencies** – These emergencies can refer to the school emergency action plan if one is in place .

Although a catastrophic event may be rare, ensuring that the EAP is updated, reviewed, and rehearsed annually by all persons involved with athletics is imperative.

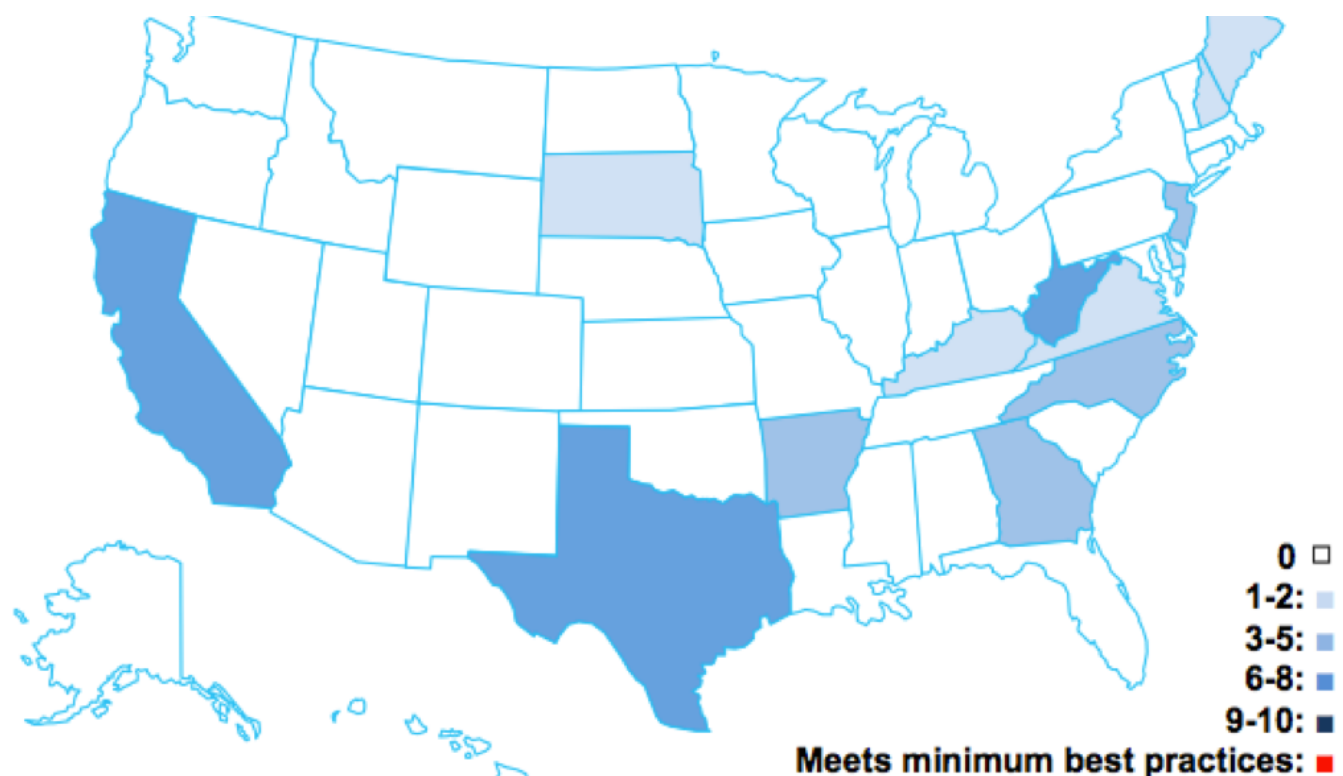


Figure 1. Representation of the number of states meeting current evidence-based practice policies for the use of EAPs in secondary schools.

Ensuring that the EAP is updated, reviewed, and rehearsed annually by all persons involved with athletics is imperative.

Basic Facts

- An Emergency Action Plan (EAP) is a written, site-specific and detailed plan of action in the event of a potential catastrophic event occurring.
- It is essential for all schools and/or universities to have a written plan of action to handle emergency situations to ensure a rapid, controlled, and precise emergency response to properly manage the situation.
- EAPs are also important and beneficial to have at all sites in which athletic or sporting events take place as they allow for:
 - A precise risk management strategy
 - Each venue to be readily prepared for emergency situations
 - Appropriate medical care to be provided in a timely and expedient manner
 - A more efficient and effective emergency response
 - The protection via reduction in liability of the medical staff and school and decreases the chance of legal action taking place

Statistics on EAPs (Figure 1)

- 22 percent of states meet the recommendation that every school or organization that sponsors athletics develop an EAP for managing serious and or potentially life-threatening injuries.
- 12 percent of states meet the recommendation that every school has a written EAP that is distributed to all staff members.
- 10 percent of states fulfill the recommendation that the EAP is specific to each venue and includes maps and/or specific directions to that venue.

KSI Fellow and Interns

THIS SUMMER, A FELLOW AND TWO INTERNATIONAL INTERNS HAD THE OPPORTUNITY TO EXPERIENCE AND LEARN ABOUT THE INITIATIVES OF KSI.

**BY KYLE MACKINNON, BS, ATC, ASSISTANT ATHLETIC TRAINER, NORTHEASTERN UNIVERSITY
ITHACA COLLEGE ALUMNI CLASS OF 2015**

This past summer, I was fortunate enough to be chosen as the inaugural Korey Stringer Institute research fellow. During my time with KSI, I learned invaluable lessons about research and policy in the world of sports medicine. In the eight short weeks I was at there, I was able to dip my hands in the many doings of the institute.

Maximizing sports and occupational safety is a large focus of the work done here, from both a research and a policy perspective. There were also a few opportunities to become involved in research studies as well, including long term performance variables in soccer players and data collection at the Lake Placid IRONMAN during July. A group of eight of us traveled to Lake Placid to collect environmental data, medical



encounter data, and volunteer at the medical tent. This was my first real experience with race medicine. There are a few other summer races that KSI collects data and volunteers at, including the Vermont Marathon and the Falmouth Road Race.

Collecting data is not all I did at KSI. Right from the beginning, I was given tasks to do involving policy and media. High school state athletic associations have a long way to go to be up to KSI's safety standards. Some policies need modification, and some need creation. This was another thing that I was able to experience. The world of public policy was foreign to me, but through KSI, I have a firmer understanding of what happens behind the scenes to make athletics work. Although there are some gaps in coverage, they are slowly closing.

My biggest project of the summer was creating a video on heat acclimatization.

My novice video making skills and I were set upon this task in the hopes of creating a resource for non-medically trained people to view for facts about heat acclimatization and safety. The video can be found on KSI's webpage or YouTube page(https://youtu.be/_fpjZ03yCOY).

As much as there was to do this summer, we were still able to find the time to be active. We had several staff soccer games, trail runs, and a golf outing. Even though I had never played a full round of golf in my life, I managed to hang with the big boys. Dr. Casa and the staff are as dedicated to fitness as they are to safety. My hope is that future fellows have the same (if not improved) experience which I had. The work being done at KSI is invaluable to the field of sports medicine and occupational safety. As long as athletics remains imperfect, the staff at KSI will be hard at work.

BY RENAN FORTE, FOREIGN EXCHANGE STUDENT SPONSORED BY THE BRAZILIAN GOVERNMENT

My name is Renan Forte and I am an undergraduate student in Dietetics/Human Nutrition at Southern Illinois University as part of an exchange program sponsored by the Brazilian government. During my period of study in the U.S., I had the opportunity to join the Korey Stringer Institute (KSI) team as a Researcher Assistant this summer. There,

I met Dr. Casa and Dr. Stearns, who gave me direction to understand multiple studies that were taking place in the lab, which all had the aim to provide evidence in the prevention of sudden death and maximizing athletic performance in sport. Through my internship, I was able to understand the importance of the presence of an athletic trainer on the sideline; always being available to



provide care to athletes during training and competition. Their presence is fundamental to prevent catastrophic accidents and also provide immediate aid, if necessary. This simple action may prevent many deaths in the athletes. In another study, I was able to learn the influence of dehydration in physically active people. This was the most valuable part of my experience at KSI, since it included the nutritional aspect of exercise as well. In this study, the data collection took place in an environmental chamber and athletes

were observed at different levels of dehydration. I was also able to partake in VO₂ max and lactate threshold test for the UConn soccer team. At the end of my internship at KSI, I had the opportunity to be a medical volunteer at the Falmouth Road Race, which according to its official website, more than 11,000 runners participated this year, including many elite level athletes. There, I was able to experience the high amount of runners who had heat-related issues (42 heat stroke patients that were successfully treated at the finish

line medical tent) during and after the road race. Also, I witnessed how prepared the medical volunteers at a road race need to be to provide immediate care to all runners and prevent any fatalities from occurring. In summary, my internship at KSI was very productive and provided me with very valuable experiences. This experience will complement my future studies in the sports nutrition area, specifically in the topics regarding hydration strategies for athletes. I was also able to better understand the procedures for athlete testing and their data management. I will be able to take this knowledge and carry it with me in my future career. The KSI team is to be congratulated for its work and scientific contribution for the sports sciences, and most importantly, to have contributed in saving lives of many athletes. I feel very fortunate and grateful to have worked with the team and I hope the KSI will continue to build its legacy in the future years.



BY YUKI MURATA, ASSISTANT DIRECTOR OF ATHLETIC TRAINING PROGRAM, CHUKYO UNIVERSITY

Over the summer of 2015, I visited the Korey Stringer Institute (KSI) for 10 days as an international intern. I work for the School of Health and Sport Sciences at Chukyo University, Japan and I am the Assistant Director of the Athletic Training program in my university. This visit was

supported by Sasakawa Sports research grants program, which aims to support prominent research in the fields of the humanities and social science that contributes to the promotion of sports in Japan. When I teach students how to prevent sudden death in sports, I often use information from KSI. So this visit

was a very exciting opportunity for me. After this visit, I have gained a better understanding about preventing sudden death in sports than before.

The most impressive and intriguing fact that I learned during this visit was the importance of cold water immersion (CWI) to treat exertional heatstroke (EHS) patients. I've learned the importance of CWI by scientific evidence that KSI staff explained to me and also through my experience at the medical tent of the IRONMAN Lake Placid, where I had an opportunity to work with the KSI. I witnessed the CWI for EHS treatment for the first time in my career. When a female athlete was transported into the medical tent, her rectal temperature was over 105°F and she was unconscious. The signs and symptoms were obviously different from exercise heat exhaustion that I am well familiar with every summer. After

about 10 minutes of CWI, she gradually regained consciousness and was able to start responding to questions from medical staff. I could now fully understand why CWI is the gold standard for EHS treatment.

After this experience, I feel it is my mission to expand information of CWI to the Japanese sports field. I believe that our university could serve as the leader of sports safety in Japan. To our regret, one of our students died from EHS in a relay road race 7 years ago. From that accident, we promised that such disaster should not happen again and we should share effective methods to prevent EHS death. Therefore, it is my role to share the experience I've gained at KSI with my students, colleagues, and community, and to take actions so that the Japanese sports field will recognize CWI as the best way to treat EHS.

KOREY STRINGER INSTITUTE SUMMER FELLOWSHIP PROGRAM

APPLICATION DEADLINE: FEBRUARY 15TH, 2016

Korey Stringer Institute is seeking talented undergraduate and graduate athletic training students to apply for an 8-week research and advocacy fellowship.

Eligibility: (1) Junior or Senior undergraduate athletic training students OR certified athletic trainer graduate students, (2) US citizenship OR appropriate student/work visa

For more information, please visit: ksi.uconn.edu.

Falmouth Road Race



BY YURI HOSOKAWA, MAT, ATC,
DIRECTOR OF COMMUNICATION AND EDUCATION

Korey Stringer Institute had another successful year working at the [Falmouth Road Race](#), which took place on Sunday August 16th. KSI and the Falmouth Road Race continued to expand their collaboration together during this year's race. On August 13th, William Adams, Director of Sports Safety Policies, Yuri Hosokawa, Director of Communication and Education, and Rachel Katch, Assistant Director of Research, presented at the 1st Annual New Balance Falmouth Road Race Sports Medicine Symposium, along with Dr. John Jardine, Chief Medical Advisor of KSI. This was the first time that the Falmouth Road Race hosted a medical symposium for the local medical professionals and volunteers who have traveled across the country to work at the medical tent on race day. At the symposium, Adams presented on evidence-based prevention, treatment, and care of exertional heat stroke, Hosokawa presented on emerging topics in sudden cardiac arrest in runners, and Katch presented on exertional hyponatremia and best practices for hydration. On August 15th, Dr. Robert

Huggins, Vice President of Research and Elite Athlete Health and Performance, spoke at the pre-race EXPO on maximizing athletic performance in the heat.

Also during race weekend, we had the opportunity to invite professional videographers to film interviews with Richard Dodakian, one of the exertional heat stroke survivors from the 2013 Falmouth Road Race, and Huggins. As they recalled the same event from the race, it was incredible to hear their stories from different perspectives—exertional heat stroke victim/survivor and the rescuer. The interview is currently under production. Please follow our social media and webpage for the video release. Their words will change the way you view medical care provided at the road races for thousands of runners. Remember, exertional heat stroke is 100% survivable with prompt recognition and appropriate care: cool first, transport second.



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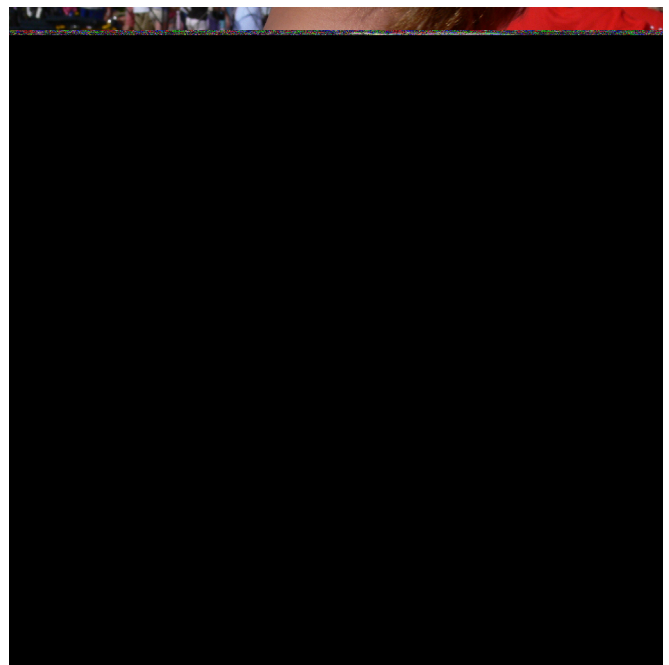
MEDICAL



This year's race was very warm and humid, setting a perfect storm for exertional heat illness risk. To counter that, the road race organizers came prepared with rows of cold water immersion tub stations, with close to 200 medical professionals volunteering on race day. KSI primarily assisted with the care of exertional heat stroke patients, educating the medical volunteers who are unfamiliar with the condition at the pre-race medical meeting and serving as leaders at each cooling station.

We were also fortunate to have representatives from our corporate partners, [Kestrel](#) and [MissionAthlete Care](#), to join us at the race as volunteers. It was their first time to experience the intensity of a road race medical tent and see the treatment of exertional heat stroke cases.

Lastly, Hosokawa and Katch conducted the third field research study at the Falmouth Road Race, looking into the inflammatory response observed in runners completing the race. The study started 4 weeks before race, where the



Falmouth Road Race



participants were asked to log their training. In addition, researchers invited the participants to the University of Connecticut campus to complete VO2max and lactate threshold testing to examine their fitness level prior to the race. Hosokawa is also working in collaboration with the EC Lee Lab, led by Dr. Elaine Lee, at the University of Connecticut, to investigate potential genetic markers that may explain the variations of heat tolerance observed in runners. Our hope is to provide evidence-based recommendations for runners who are participating in summer road races and assist the Falmouth Road Race to become one of the safest summer road races in the world.



Falmouth Road Race weekend is by far the busiest, but most exciting weekend for KSI. We hope that our collaboration with the race will continue to grow in future years and hopefully inspire other races to have similar partnerships with KSI.

Heat Safety Pledge

BY LESLEY VANDERMARK, MS, ATC
DIRECTOR OF RESEARCH

The **Mission-KSI Heat Safety Pledge** is doing well, coming out of its second summer! We've had almost 60 schools apply, and almost 30 qualify, with several more applications in the works. Congratulations to Mustang High School in Oklahoma for being the first school accepted after revising their policies! The athletic trainer and athletic department are keeping their eyes towards athlete safety in the heat by assuring heat acclimatization, environmental monitoring, good coach education, and appropriate hydration and cooling are in place for all sports. Heat safety is important for all athletes, no matter which state they play in. Schools from Alabama, Arkansas, Colorado, District of Columbia, Florida, Georgia, Maine, Maryland, Massachusetts, Nebraska, New Jersey, North Carolina, Ohio, Oklahoma, Rhode Island, Tennessee, Texas, Utah, and Washington have all successfully taken the pledge.

A little background on the Heat Safety Pledge: Mission Athletecare prides itself on creating the best athletic environment for performance and safety. As part of that goal, they wanted to find a way to reward high schools for upholding appropriate policies for heat safety. Mission wants to donate \$1 million of product to schools nationwide who are striving to keep athletes safe. Mission and KSI devised the Heat Safety Pledge, 6 pillars aimed at safety while exercising in the heat. We feel that these are the 6 key areas that help high schools athletes perform at their best and stay safer while exercising in the heat. Environmental monitoring, coach education, presence of an athletic trainer, emergency planning, heat acclimatization guidelines, hydration, and body cooling are all critical steps that every school should take for athlete safety, and comprise the pillars of the pledge.

Outside of ensuring an athletic trainer is employed for the school, the pillars of the heat safety pledge require little funding. Emergency action plans, for example, are virtually cost-less! If you're unsure if your school makes the cut, take a look at the KSI website for more information on heat safety. Additionally, application for the heat safety pledge allows KSI to review safety policies and give valuable feedback for improved heat safety. Join high schools nationwide using Mission Athletecare products to enhance heat safety by **applying today!**

Helmet Material Testing

BY ALICIA PIKE, MS, ATC,
ASSISTANT DIRECTOR OF YOUTH SPORT SAFETY

This past summer, Alicia Pike, Assistant Director of Youth Sport Safety, joined Tom Bowman, Associate Professor of Athletic Training at Lynchburg College, senior Lynchburg College student, Dane Bower, and Katie Breedlove, athletic trainer at TRiA orthopedic group, on a trip to Michigan Technological University (MTU) in Houghton, MI, for a helmet material testing research project. During the 3-day trip, they worked directly with assistant professor of Materials Science and Engineering at MTU, Erik Herbert, who was able to give insight on how nano-indentation could be used as a procedure to test the material properties of various athletic helmets, including football, hockey, and lacrosse.

Nano-indentation is a variety of indentation hardness tests used to measure elastic modulus and hardness of the specimen (various helmet shells) from load-displacement measurements.

The results obtained from this procedure reveal characteristics of a helmet's material properties, and when used in conjunction with previous drop test data, can assist in determining the characteristics of helmet materials that

best reduce risk of catastrophic head injuries such as skull fractures and hematomas. Having the ability to test helmets in this manner can help determine why certain football, lacrosse, and hockey helmets meet National Operating Committee on Standards for Athletic Equipment (NOCSAE) standards, while others do not. Since this process is most commonly seen in the engineering world, and is rather foreign to health care professionals, it was beneficial to travel to MTU and utilize resources and equipment that are otherwise not readily accessible at the University of Connecticut.

Nano-indentation process:

1. Sample preparation – sections of helmets were cut out from predetermined areas
2. Place samples on pucks under indenter
3. Samples indented with hard pyramid-like diamond tip
4. Load placed on the indenter tip increases, pressing the indenter further into the specimen (helmet material) until it reaches a user-determined value
5. Load, unload, and hardness of material are now measured

Assessing Traumatic Brain Injuries

BY DAVID BAUMAN
DIRECTOR OF PUBLICITY MARKETING
UConn COMMUNICATIONS

UConn researchers are working with college athletes to test a new device that can quickly assess concussions and other traumatic brain injuries.

The device, developed by Bethesda, Md.-based medical neuro-technology company BrainScope Co. Inc., is a handheld instrument that can help clinicians identify traumatic brain injury (TBI) at the time and place of injury.

"BrainScope approached the Korey Stringer Institute because of our extensive background in conducting research studies," says UConn graduate student Samantha Scarneo, director of youth sports safety at the Korey Stringer Institute. The concussion study "aligns with KSI's overall mission to prevent sudden death in sports and overall safety in all levels of sport," she adds.

The device, which is not yet available commercially, is about the size of a smartphone. Placed on a patient's head, it measures a patient's electroencephalograph (EEG), or brainwaves, to gauge brain function after head injury.

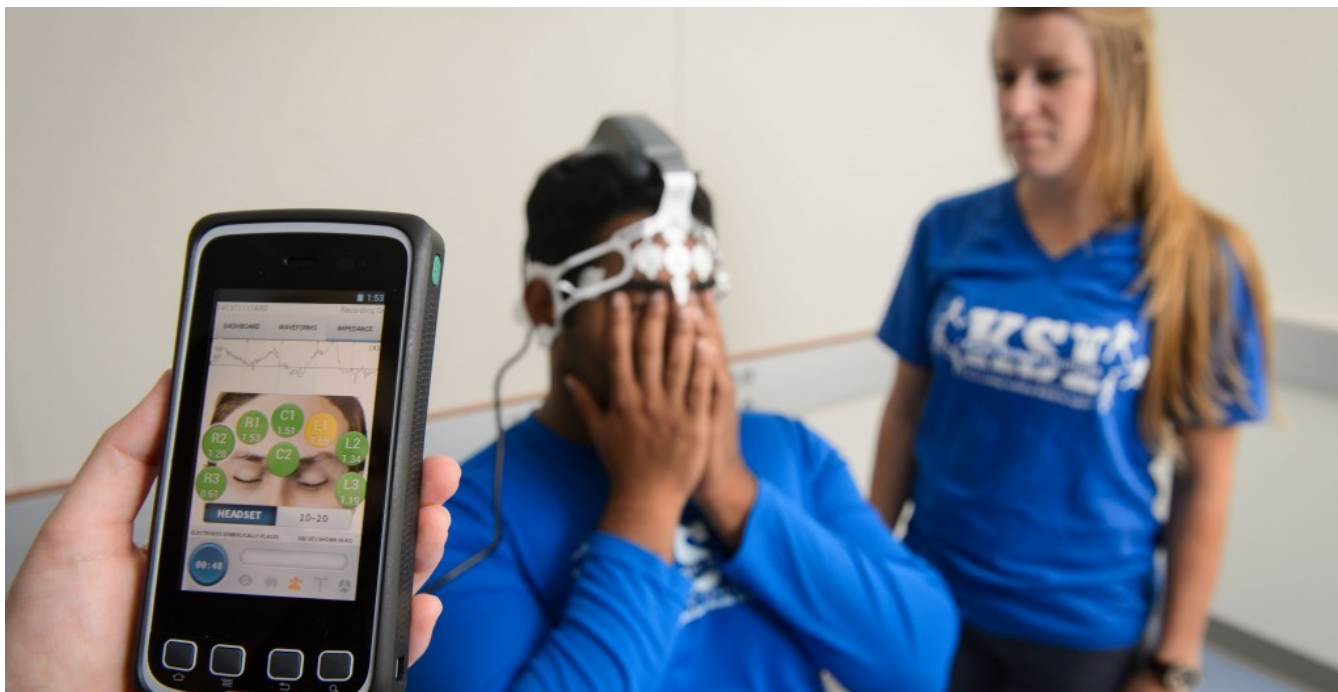
The non-radiation-emitting instrument

was developed for military use in war zones, and is being adapted for athletes who sustain a TBI while playing contact sports. Within 10 minutes, the device can help medical personnel determine whether it's safe for a player who's had a head injury to return to the athletic field.

TBIs include structural injuries such as a bruise or bleeding in the brain and what experts call a "milder form" of TBI, concussions, caused by a bump or jolt to the head. These injuries can alter brain function yet be difficult to detect, as they don't always cause immediate symptoms.

UConn, one of nine universities participating in the nationwide study, offers an added benefit in the form of state-of-the-art MRI equipment at the University's new Brain Imaging Research Center, and scientific staff to analyze and make sense of the diagnostic and medical imaging data generated by the study.

Peter Molfese, assistant research professor and director of operations at UConn's Brain Imaging Research Center, notes that MRI works by manipulating magnetic fields of hydrogen molecules



in the body to identify the structure and function of different brain tissues.

After a concussion or other traumatic brain injury, Molfese says, there is a reduction in both gray and white matter in the brain. "Less brain means that functions that were otherwise handled by particular areas need to be remapped to other areas. However, the brain's ability to remap function is not perfect, and various levels of head injury can leave people with permanent brain damage that can hinder their abilities later on."

Research efforts to accurately and quickly evaluate TBIs have intensified in the U.S. because of the toll they have had on the U.S. military (300,000 cases since 2000, according to the Department of Defense), and high-profile lawsuits brought against the National Football League by former players for its handling of concussions. In addition, a recent Centers for Disease Control and

Prevention report found that 2.5 million emergency department visits, hospitalizations, or deaths were associated with TBIs.

The UConn researchers are now working with both UConn club sports teams and Eastern Connecticut State University varsity and club sports teams to enroll athletes for the study. They aim to complete data collection in December or by the end of the spring sports season in 2016, depending on the number of athletes who sustain concussions. The study will use the Brain Imaging Research Center's fMRI machine for all of its MRIs, on both injured and non-injured participants.

The interdisciplinary team working on the study includes Douglas Casa, head of the Kinesiology Department's Korey Stringer Institute, and Jeffrey Kinsella-Shaw, director of the physical therapy doctoral program, in addition to Scarneo and Molfese.

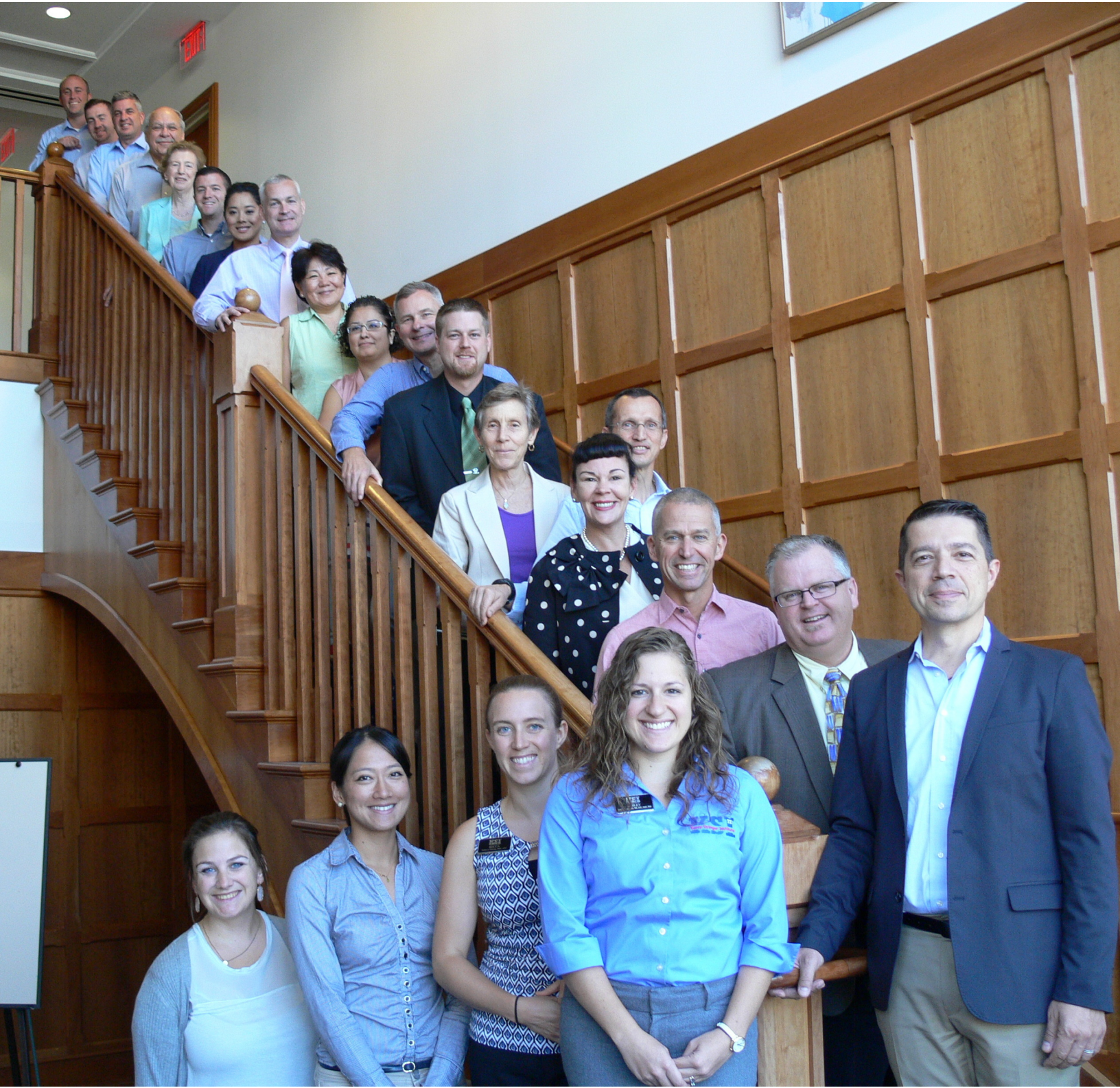
Malignant Hyperthermia Round Table

BY YURI HOSOKAWA, MAT, ATC,
DIRECTOR OF COMMUNICATION AND EDUCATION

On September 17-18th, Korey Stringer Institute (KSI) and the National Athletic Trainers' Association (NATA) co-hosted a Round Table on Malignant Hyperthermia (MH) in Physically Active Populations at the University of Connecticut (UConn). The two-day meeting was co-chaired by Yuri Hosokawa, MAT, ATC, and Douglas Casa, PhD, ATC and was attended by researchers and clinicians who hold expertise in exercise related heat illnesses and MH from eight different institutions around the world (KSI, UConn; NATA; Malignant Hyperthermia Association of the United States [MHAUS]; Uniformed Services University of the Health Sciences [USUHS]; Toronto General Research Institute; Laveran Military Teaching Hospital; Central Michigan University; University of Arkansas). The purpose of this round table was to explore the association between MH, exertional heat stroke (EHS), and exercise induced

rhabdomyolysis (EIR).

The first day of the two-day meeting was focused on formulating a common understanding on MH, EHS, and EIR among athletic trainers, sports medicine physicians, emergency medicine physicians, anesthesiologists, and researchers to establish a consensus on the topic. Hosokawa opened the round table addressing the potential links that suggest an association between the three medical conditions (MH, EHS, and EIR) and the gaps in the scientific literature for future research and interdisciplinary collaborations. Henry Rosenberg, MD, President of MHAUS, presented a historical overview of MH, which further highlighted the need for more robust, longitudinal research to answer the question; are MH, EHS, and EIR related? John Cappachione, MD, from USUHS, Sheila Riazi, MSc, MD, FRCPC, from Toronto General Research Institute, and Emmanuel Sagui, MD, from Laveran Military Teaching Hospital, presented on



the epidemiology of MH in different cohorts of individuals. Cappachione shared data from the U.S. Military surveillance data, which suggested the potential interplay between MH and EIR. Riazzi presented on data obtained from the Canadian MH Center, where people with recurrent EHS or EIR episodes were further investigated for MH susceptibility. Sagui presented data from the French military, where a biopsy halothane-cafeine contracture test was routine screening for recruits who sustained EHS until recently, which initiated a great discussion over heat tolerance capacity in individuals who are MH susceptible.

Day two of the round table focused on the identification, management, and outcome of MH and ways to translate the research findings to clinical practice. Nyamkhishig Sambuughin, PhD, from USUHS presented on the use of exome

sequencing to uncover pathways and relationship between MH and EIR. Sambuughin's presentation was followed by Sheila Muldoon, MD, from USUHS, who presented multiple case reports on MH-like syndromes that occurred in exercise context, which provided an important leading question to discuss special considerations for physically active populations in preventing, detecting, and managing MH. This round table was the first of its kind, bringing experts from various backgrounds to discuss MH. The round table proceedings will be published in the Journal of Athletic Training, which will summarize the current consensus on the significance of MH in physically active populations and identify future directions in research for the identification, prevention, and treatment of conditions associated with MH in the physically active.

Symposium: Malignant Hyperthermia in Physically Active Populations-*Application of genomics in exercise science*

Douglas Casa, PhD, ATC, and Yuri Hosokawa, MAT, ATC, from the Korey Stringer Institute, and Fran O'Connor, MD, and John Cappachione, PhD, from the Uniformed Services of the Health Sciences will be presenting current topics on malignant hyperthermia in physically active populations in a symposium session at the National Athletic Trainers' Association (NATA) Clinical Symposia and AT EXPO. The date and time for the symposium is to be announced by the NATA.

UPDATES ON OUR YEAR-LONG PROJECT ON
ATHLETES' **PERFORMANCE**

ANDREA FORTUNATI, BS, ATC

ASSISTANT DIRECTOR OF ELITE ATHLETE HEALTH AND PERFORMANCE

Soccer Study

Athlete monitoring is becoming the norm in NCAA athletics. More teams are adopting practices that European scientists have been using for years. Coaches are using these advanced analytics to determine not only how hard their athletes are working, but also when to let them rest and recover. However, many questions still remain unanswered as to how to interpret and integrate these measures to increase performance.

The Korey Stringer Institute has been performing a large research study with the **University of Connecticut Men's Soccer team** since January 2015 and who recently competed in the NCAA Division I Men's Soccer Championship. When this study is finished, we will have collected over 200 days worth of data. The goal of this study is to monitor athletes both on the field using Catapult MinimaxX™ GPS devices and Polar Heart Rate monitors, and off the field using the Quest Diagnostics Blueprint for Athletes panel. From these data we hope to quantify the player's work loads, intensities, speeds, and accelerations so that we can create a "norm" for each player during practices and competitions. With this information we can help the coaching and sports medicine staff keep the players on the

field and make critical decisions about playing time and recovery.

One of our most intense data collection periods was during pre-season in August, which required anywhere from ten to fifteen researchers to assess all of the athletes before, during, and after practice sessions. On top of practice sessions, weight training was also tracked to help quantify how hard each athlete trains during these intense sessions with their strength and conditioning coach, Chris West, who has recently been named Director of Exercise Science in the Department of Athletics.

Data from this study related to injuries, injury rates, preparedness and fatigue are also areas that we are very interested in. We hope to determine if this data can predict how ready a player is and potentially what makes them more likely to become injured. Readiness reports for each athlete are being created to determine how well the athletes are expected to perform during the match based off of performance measures collected prior to competition.

KSI hopes that this study is the launch pad for many projects with other teams here at UConn.

Personal Story

#02: CAROLE KNIGHTON, MOTHER OF HUNTER KNIGHTON, TELLS THE STORY OF A LIFE-ALTERING EVENT THAT HIT THE FAMILY. HUNTER IS BACK ON THE FIELD AS A MIAMI HURRICANES LINEMAN. (THIS SPEECH WAS GIVEN BY CAROLE AT THE KSI GALA IN MAY 2015.)

I am a flight attendant, I am a mother of 4, and now I am an advocate for the prevention of heatstroke.

My newest role seemed very unlikely over one year ago. My knowledge of heatstroke was pretty limited to babies inadvertently locked in hot cars, and elderly shut in hot houses during extreme heat waves. Never did I consider accomplished athletes could be at risk. Oh I knew football had its risks. I worried about concussions, torn ACLs, and high ankle sprains. Being a Football Mom is scary stuff... but never did I worry about heatstroke... that is until my 20 year old son Hunter, an offensive lineman at the University of Miami suffered one. The morning of February 24th, 2014.

But I should have worried... For my son had all the makings of a perfect storm... an exertional heatstroke that Monday morning.

He was sick, as a matter of fact he spent all weekend in bed with severe a sore throat. Jeff, my husband, had urged him to make sure he told the athletic trainers. It could be strep throat he warned him.

College football players don't have sick days and he dragged himself out of bed and across campus to practice and to tell them he was sick. He was NOT held out of practice. He was given a throat lozenge.

The second key ingredient was his size. Hunter was tall, 6'5" but he came in at 258lb, far too light to play lineman at a Division I program. He was obsessed with gaining girth. Coaches berated him for being too small. They had him worried. After repairing a torn labrum, moving off campus, and cooking for himself, he started gaining. He was happy. Coaches were happy. He packed on 35lbs.

Now he had the weight to play. Spring would be his time to prove himself. He was on a mission to show everyone they were wrong about him. He had come in unheralded. He was no media-darling. No one ever had him in the conversation of playing. He was a red-shirt three-star freshman in a town that reveres four and five star players. Some fans on message board had even questioned why he was offered a scholarship. Hunter took it all in and used it as fuel. He would show everyone. Coaches were noticing during

His temperature was actually 109°F making his survival all the more miraculous and recovery all the more improbable.

spring conditioning. He was leading, asserting himself just as he had always done in high school and in the Catholic Youth Organization where he began playing. He always had “extra” when everyone else was gasping. Powering through fourth quarter pain, exhaustion for one more BIG play. He never quits, EVER. He is a warrior.

Which I later learned is another key ingredient to the perfect storm.

He vomited after lifting. Still not held out of practice... he headed outside. He remembers thinking: “This is going to SUCK... I hope I don’t lose my black jersey.” The black jersey is the signal of a starter and he had 5 of them. He was captain of his squad which was short players compared to the others... so they had to do extra reps. He remembers up to the second drill then NOTHING else for two and half weeks.

But he continued to compete and he was crushing it. Beating everyone. Perhaps that is why no one noticed he was in trouble. He completed the whole workout...45 more minutes. It wasn’t until he started to go in the wrong

direction that Coach Donofrio pulled him out.

Hunter jogged to the sidelines and grabbed the head athletic trainer in a deathrip and began having seizures. They had to pry him off taking several linemen to put him in a cart and carrying him towards the parking lot where 911 had been called. The EMTs met them and he was taken to the Hospital, the closest one to the campus.

When I got the call asking if Hunter had a history of seizures and was told he had a temperature of 107°F, my sister, a nurse, assured me it probably wasn’t accurate. It was taken on the field in the hot sun causing a false-read. I felt better... it was short lived.

I would later learn his core temperature wasn’t taken on the field at all... The first cooling measures were NOT performed until AFTER he reached the ER. His temperature was actually 109°F making his survival all the more miraculous and recovery all the more improbable.

He was in kidney failure, liver failure, his brain was swelling and he was unresponsive on a ventilator. The doctor

The same spirit that fought for his life in the ICU would now fight for his recovery.

told us we needed to get there!

Before we boarded the plane we called for an update. His kidneys started to work. This was huge. They were going to transfer him to WM hospital trauma unit.

We had hope. For it is in these moments you cling to hope and your faith. "God, please keep him alive... God let us get to him."

We did get to him, but he was in bad shape. How could this have happened? It wasn't even hot that day, low 70's. He was in great condition... he was sweating.

His locker was searched. Teammates questioned. Surely, HE must have done something to cause this, they reasoned. But there were no drugs (except chloresaptic spray and DayQuil). No supplements. No steroids, no weekend of wild women or partying. He hadn't done anything wrong. It was simply the perfect storm:

1. He was sick... he tested positive for Influenza A, a particularly deadly strain that was hitting 20-40 years old unusually hard, and he was not held out of practice.

2. He was BIG... recently adding 35lbs.

3. He was a warrior...never quits and carries out orders. *He suffered an exertional heatstroke!*

The next two and half weeks in ICU were a roller coaster. Brainwaves were measured (suffering so many seizures no one was sure if he wasn't brain damaged). He contracted double-pneumonia resistant to antibiotics. He required two transfusions because his platelets were destroyed. Liver was precarious with hepatitis. He would run fevers and struggle to breathe. He remained in a coma for weeks.

Eventually he opened his eyes and was weaned off the ventilator. Then didn't shut his eyes for days suffering from ICU Psychosis. The day he left the hospital he needed a procedure to fix his paralyzed vocal cords from the intubation. On the short walk to the elevator he paused as he struggled to breath. He looked up at me and said, "I thought I would be practicing next week, but it may take me a little longer." I marveled. Yes, the warrior-spirit had not succumbed to



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heatstroke. The same spirit that fought for his life in ICU would now fight for his recovery.

It wouldn't be easy. He was Humpty Dumpty shattered into hundreds of pieces. The recovery process would be torturous filled with highlights and lowlights. He had obvious signs of nerve damage to his arm. Breathing, swallowing, eating were all challenging. His skin peeled like a snake, shedding his entire body. The depression and the PTSD.

I would have to make sure he was put back together carefully... lining up the pieces and gluing them together so the cracks and lines were as unnoticeable as possible. All was done with the help of God. I prayed for answers and guidance. I needed him to regain his life... ALL of it as much as possible. For him it was football... always it was football. It was

the driving force behind this God-given miraculous life. He told me I came to Miami to be a player not a patient. He dreamed of playing college football and restoring the Hurricanes to national prominence, and it is in that dream he could truly be healed.

But we were losing hope. He was making progress physically but how on earth would he return to play Division I football. Could he do it? Should he do it? How would he do it?

The neurologist wanted him to take a biopsy to rule out malignant hyperthermia. If he was negative, he would clear him. But would Miami Athletics let him return? His doctors at UM Hospital believed he would make a full recovery but wondered why he would want to play football.

Miami said he must pass heat tolerance testing in October at the Korey Stringer Institute and the biopsy was scheduled for November at Wake Forest University.

At first KSI sounded like a place where his dream could potentially end. What if he didn't pass? Another hurdle. Another obstacle.

After meeting with Rebecca, Rob and Doug, I knew this is exactly what we had prayed for. It wasn't an obstacle but guidance that would help us to return. It was an assessment of where he was in the recovery process, then instruction on how to get him where we needed him to

be. A roadmap to recovery.

He was brought back February 4-5th to see his progress. He was just shy of passing. It was time for him to start working outside in the heat.

Miami was nervous about it and who could blame them. No book will tell you what to do if a player has a core temperature of 109°F...nearly dies...lives...and wants to play football again.

BUT there is the Korey Stringer Institute. I urged Miami to listen to the experts and they agreed.

Rebecca came down to Coral Gables in March to show UM that they could monitor him using an ingestible core body temperature pill. She showed them what he could and should be doing for acclimatization. He was now wearing equipment. She set it all up for them and instructed them how they could be preparing him for his return for testing later this month.

Hunter must play to fully recover. He must play to fulfill his dream.

He doesn't dream of his return for himself but to honor God, for without God none of this would be possible. He wants to return for his little brother, Hayden, who looks up to him and dreams of playing college football too, but who's innocence was shattered by seeing his brother cling to life in ICU.

He wants to return for his little sister,

Savannah, who will be studying in the fall at LSU to be a certified Athletic Trainer. So no mother...no family...goes through this nightmare again.

For his older brother, Jay, who never had the same opportunity to play in a storied Division I program but helped Hunter with his drive.

For his grandfather who prayed for his grandson's life...the same grandfather who attended Notre Dame but proudly wore his Miami Football shirt after Hunter committed. Never seeing him play...passing away on the day of biopsy at Wake Forrest on November 14th.

For his parents that sacrificed and struggled to keep him in the high school, which gave him his best chance at a Division I scholarship after his dad lost his job.

For Coach Dave Dudeck who believed in him in high school. For Coach Art Kehoe and Coach Al Golden who believe in him now.

For the doctors who told me, "I prayed so hard as I worked on your son."

But mostly he wants to play for those who cannot. Korey Stringer, whose life was tragically cut short by the very same thing that nearly took my son's life 13 years later.

And he wants to return to play for the Korey Stringer Institute, started by Kelci to honor her husband's legacy and now gives us hope. Thank you, God Bless.

Forged in the Furnace

BY BOB PARKS

MEN'S HEALTH, AUGUST 2015 ISSUE

Dripping sweat and nearly delirious, I'm running on a treadmill inside a torture chamber: the prison-cell-size "heat sensory lab" of Doug Casa, Ph.D., a professor of Kinesiology at the University of Connecticut's Korey Stringer Institute.

The room is a stewing 104°F and 40 percent humidity. And my insides are slowly cooking too, at least according to the thermometer I have stuck up my butt. (Another torture.) My core body temperature hit 101° after about 30 minutes of jogging. Now, 20 minutes later, I'm hovering around 103°—dangerously close to heatstroke. My limbs feel heavy; my brain is foggy. I'm working twice as hard to keep moving, but time feels like it's standing still, which makes me increasingly agitated. There's a training method to this madness. As a 40ish runner who's lost a step over the years, my mantra about exercising in extreme temperatures is usually "Heat? Ack!" In other words, I avoid it. But then I started hearing rumors about a new style of training

dubbed "heat acc," short for heat acclimatization. The legendary triathlete Jesse Thomas reportedly caps off his hard workouts in a sauna. (In May, he won the Wildflower Triathlon for the fifth time; it's one of the largest in the world.) And Iron-man Chris Thomas (no relation) cranks his own climate at his home. (At 42, he won three races in the open amateur category last year against guys half his age.)

The protocol they're both using is becoming standard among athletes seeking an edge. Originally developed by Chris Minson, Ph.D., of the University of Oregon, and outlined in the *Journal of Applied Physiology*, the idea is the push your core temp up to 101.3° and then train for an hour at that threshold or just above it. Do this for 10 days straight, and you can condition yourself to use oxygen more efficiently and tire less quickly, the researchers report.

How effective is it? Casa, a Minson disciple, works with NFL players, the U.S. Army Special Forces, and elite athletes to safely heat up their potential. "It's basically natural blood doping," he says.

After Casa takes my vitals, he sends me home with instructions to keep the workouts going. His pep talk is more clinical than rousing. "Even three days in, you'll already have some adaptations, so it should feel easier," he says. "After 10 days you'll have achieved the full effect."

It sounds easy, but I'll be initiating some complex processes that will alter my VO₂ max and lactate threshold – that is, how much air I can suck in under stress and how long it takes for my muscles to cry uncle. Both hinge on a broader physiological factor: blood plasma volume. During heat acc, your kidneys register stress from your reduced blood oxygen and higher heart rate, and release chemical signals to produce more blood plasma. The more plasma your body makes, the more easily it can circulate oxygen-rich blood, keeping your skin cool, muscles clear of lactic acid buildup, and gut primed for efficient hydration.



Time to bring the heat. I drag my treadmill into the laundry room, stuff the windows with insulation from Home Depot, and crank up three space heaters and a humidifier. When all that gear is turned on, the room easily hits 115°F. Each of my training sessions lasts 90 minutes: It takes half an hour of steady running to hit that 101.3° mark, and another hour of furnace-fueled punishment to start sparking gains. Sure, my rig blows a few fuses, but I have to congratulate myself: I've managed to replicate what hell must feel like.

Would Satan insist on regular rectal probing? Casa does. To hit 101.3 safely, you'll need to put a thermometer up your arse about every 10 minutes during the first few torching. After you're more experienced, you can do it every half hour.

There is an alternative: the CorTemp Ingestible Sensor, a vitamin-size digital thermometer pill. You swallow it and wait for reading to pop up on a handheld receiver. I tried a demo and the pills worked, but I had to plan ahead – The pill needed time to settle in my stomach for accurate readings. Then I had to train right away or risk “downloading my data” too early. At \$2,600 for the wireless receiver plus \$40 per pill session, I figured I’d stick with the rectal probe.

Men training this way may lose up to 2 quarts of water an hour, Casa says, so you have to hydrate constantly. Another problem: roast beef sandwiches and Heineken. I’m burning tons of calories but replacing them so lazily that I gain a pound or two.

Then there’s the heat from my wife. At UConn, Casa had warned me: “Spouses hate me because the room will stink long after you’re done working out,” he said. Or, as my wife puts it one day, “Are you trying to replicate Gwyneth Paltrow’s experiments with vaginal steaming?”

That’s funny, until later in the week when we try to have sex. For some reason, I’m erect but can’t climax – probably because I’m so physically drained. She’s happy but I’m annoyed. Not the endurance I’d had in mind.

On my return trip to Casa’s lab, I learn that suffering pays off. After 10 days, my VO2 max has improved by 9.3 percent. My lactate threshold is at... wait, what

threshold? In interval workouts, my legs feel so light that I rock a 5:27-mile pace.

When my wife finally demands that I dismantle the hotbox, I agree. But from Casa’s recent experiments, which he expects to publish in the next year or two, it appears that I’ll need to reignite myself once every five days to maintain my gains.

Now I run exactly when I always feared it the most – at noon, under the summer sun. The best part is, I’ve ditched that crappy thermometer. After a few uncomfortable spot-checks with it in a nearby porta-potty, I learned to gauge exactly how hard my body is working.

At a recent 5k in Fort Devens, Massachusetts, I finished third overall, dropping several guys who used to beat me. No sweat.



JONES AND BARTLETT LEARNING

KSI served as the content expert for the **Preventing Sudden Death in Sports and Physical Activity: An Interactive Online Program**. This course is an approved evidence based practice CEU program (10 units) by the Board of Certification. The course includes interactive video modules that will test learner's ability to make clinical decisions based on the observations and information provided in the video scenarios.

We are also pleased to announce that the second edition of the book, **Preventing Sudden Death in Sport and Physical Activity**, will be released in the Winter 2016.

ON-GOING INITIATIVES

The **National Center for Catastrophic Sport Injury Research** continues to recruit, interview and investigate catastrophic injuries in sport. We have had great success in finding cases through media articles and referrals, but are seeking help to spread the word about our online reporting system that anyone can use to report cases of fatal or non-fatal catastrophic injuries in sport: <https://www.sportinjuryreport.org>. This is a critical database to assist in determining the most prevalent factors resulting in athlete deaths and those that also result in athlete survivals. We hope that such information can be compiled to help drive policy changes to help protect athletes.

NATA INVOLVEMENT

Korey Stringer Institute has continued its collaboration with the NATA and has many projects that are continuing or starting up.

These include:

1. **Youth Sport Governing Bodies, Year #2:** The meeting is being held once again at the NFL headquarters in January and will include all the major governing bodies in youths sports to review progress made from last year and identify next steps to continue to make improvements and progress.
2. **Collaborative Solutions for Sport Safety, Year #2:** The meeting is being held at the NCAA headquarters in Indianapolis on March 22nd and 23rd. This will include representatives from all 50 state's athletic associations and medical governing bodies to discuss updates and progress made from last year and continue to address the issues that present the most pressing issues in high schools sports.

SPOTLIGHT



**WILLIAM ADAMS,
MS, ATC**

KSI STAFF

**DIRECTOR OF SPORT SAFETY
POLICIES**

KOREY STRINGER INSTITUTE

Could you tell us about yourself?

I am entering my 4th year of my doctoral studies at UCONN where my dissertation will be focused on recovery after exercise-induced dehydration. I received my Master's degree from UCONN in exercise science and my Bachelor's degree from the University of Wisconsin-Madison in Athletic Training. As a clinician, I have experience at the collegiate and secondary school setting as well as various mass participation events such as Boston Marathon, Marine Corps Marathon, and Falmouth Road Race. My research interests entail: thermal physiology, hydration, maximizing athletic performance in the heat, and preventing sudden death in sport.

Currently at UCONN, I work in KSI as the Director of Sport Safety Policies and teach within the Athletic Training Program. As the Director of Sports Safety Policies at KSI, my responsibilities encompass working closely with secondary school athletics/activities associations and assisting them enhance their state's current sport safety policies to meet minimum best practices. I am also the liaison between KSI and Camelbak, one of KSI's corporate partners, where I assist them with their hydration related initiatives and their involvement with KSI.

On a more personal note, I enjoy watching and participating in sports. I love being outdoors doing anything active (hiking, snowshoeing, skiing/snowboarding, etc.) and am an avid runner and cyclist. I am married to an amazing woman, Ami, who I met working medical at the Boston Marathon in 2011. We have two dogs, a 14-month-old Boston Terrier named Quincy and a 10-year-old Chihuahua named Ninja.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute?

My first interaction/involvement with KSI happened right after I arrived to UCONN to start my Master's. KSI started in April 2010 and I arrived in August 2010. I was immediately drawn to KSI and the overall mission of preventing sudden death in sport. I began volunteering with KSI almost immediately after starting at UCONN, assisting with various projects as they came up. During my second year of my Master's I became more involved and had a stronger desire to be a part of this great organization. I was fortunate to stay on for my PhD at UCONN where at that point I became the Director of Sport Safety Policies, which is the role that I currently have now.

In what ways has KSI impacted you?

KSI has had a great impact on my life and professional career. The ability to reach out to various organizations that end up impacting thousands of people, along with educating other medical providers, laypersons, etc. on preventing sudden death in sport, has been such a rewarding experience. One event that I think perfectly sums this point up is the Collaborative Solutions in Sport Safety meeting that KSI along with NATA and AMSSM held in March 2015 at the NFL offices. Bringing together a representative from each state's high school athletics association and each state's sports medicine advisory committee for a two-day meeting to discuss policy changes was a very gratifying experience. It was amazing to see the positive energy and enthusiasm that each representative brought to the meeting and how receptive everyone was in regards to making changes to current policies to help keep student athletes safe during sport participation.

THE ABILITY TO REACH OUT TO VARIOUS ORGANIZATIONS THAT END UP IMPACTING THOUSANDS OF PEOPLE... IN PREVENTING SUDDEN DEATH IN SPORT, HAS BEEN SUCH A REWARDING EXPERIENCE.

THE SPOTLIGHT SERIES WILL FEATURE THE PEOPLE OF THE KSI, AND THOSE WHO SHARE AND REPRESENT THE PASSION OF THE KSI.

Could you tell us about yourself?

I am currently an Assistant Professor at Temple University's College of Public Health; Department of Kinesiology, specifically within their athletic training education program. I teach undergraduate and graduate courses in athletic training including Emergency Medical Response, Therapeutic Modalities Practicum, Functional Anatomy and the graduate level rehabilitation courses. I received my Bachelors of Science in Athletic Training with a minor in leadership studies from California University of Pennsylvania, my Masters of Arts in Kinesiology from the University of Connecticut, and my PhD from the University of Connecticut in Kinesiology.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute?

I was involved with KSI since the inception. I was involved in the initial planning meetings, kick-off of the institute at the NFL draft, and development of the goals and mission.

In what ways has KSI impacted you?

KSI has opened many doors and lead to many opportunities for me to grow professionally. I've been able to pursue my research interest in the field of athletic training- educational and policy development in preventing sudden death and injuries in sport. I've met many colleagues and developed numerous professional relationships. I've also gained invaluable experience in treating exertional heat stroke that I bring to my students, as well as teaching experiences through my time working with KSI.



KELLY PAGNOTTA

PHD, ATC

KOREY STRINGER INSTITUTE

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UNIVERSITY OF CONNECTICUT ALUM

2014



On April 23, 2010, KSI had its "kicked-off" meeting at the NFL draft. From left: Rebecca Stearns, Douglas Casa, Kelly Pagnotta, Julie DeMartini

UPCOMING EVENTS

Eastern Athletic Trainers' Association Annual Meeting

January 9-12, 2016

Boston, MA

American Meteorological Society Meeting

January 11-14, 2016

New Orleans, LA

Youth Sport Safety Governing Bodies Meeting

January 20-21, 2016

NFL Headquarters, New York, NY

Collaborative Solutions for Safety in Sport

March 22-23, 2016,

NCAA Headquarters, Indianapolis, IN

International Hydration Summit

April, 14-15, 2016

University of Connecticut, Storrs, CT

5th Annual KSI Gala

May 5th, 2016

NFL Headquarters, New York, NY

ACSM Annual Meeting

June 1-4th, 2016

Boston, MA

Safety in Soccer Conference

June, 2016

Chicago, IL

NATA Clinical Symposia and AT Expo

June 22-25th, 2016

Baltimore, MD



SNAPSHOTS

KOREY STRINGER INSTITUTE
MAKING CHANGES EVERYWHERE...!



How many Dr.'s and graduate degrees does it take to "escape the room"? We nailed the mystery solving and almost made the wall of fame! #teamwork



Belval received an alligator mount as a thank you gift from the Louisiana Athletic Trainer's Association.



Dr. Douglas Casa gave a heat lecture at his alma mater, University of Florida.



Look who we found at the NATA Annual Meeting convention center!



(From left) Dr. John Jardine, William Adams, Rachel Katch, and Yuri Hosokawa at the NB Falmouth Road Race Medical Symposium.



Posing with the Kestrel Drop at the Women's FIFA World Cup in Canada.



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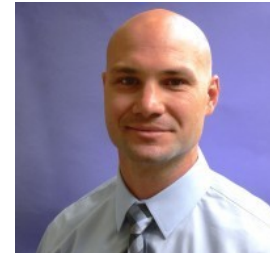
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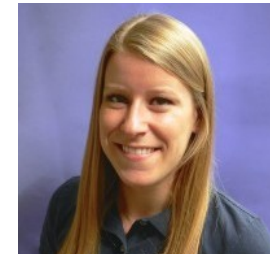
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Attending Physician, Landmark Medical Center

Co-Medical Director, Falmouth Road Race

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Pertinacity- The Stories of KSI

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KSI SERVES THE NEEDS OF ACTIVE INDIVIDUALS AND ATHLETES AT ALL LEVELS- YOUTH, HIGH SCHOOL, COLLEGE, PROFESSIONAL, LABORERS, SOLIDERS, RECREATIONAL ATHLETES- AND THOSE WHO SUPERVISE AND CARE FOR THESE INDIVIDUALS. OUR SERVICES INCLUDE CONSULTATIONS, ADVOCACY, EDUCATION, RESEARCH, ATHLETE TESTING, AND MASS-MARKET OUTREACH.

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